DOCTOR OF PHILOSOPHY

Characterising homeless people in Scotland

can oral health, health and psycho-social wellbeing enhance the ETHOS typology of homelessness?

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Characterising homeless people in Scotland: can oral health, health and psycho-social wellbeing enhance the ETHOS typology of homelessness?

Jennifer Collins

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University of Dundee

CHARACTERISING HOMELESS PEOPLE IN SCOTLAND: CAN ORAL HEALTH, HEALTH AND PSYCHO-SOCIAL WELLBEING ENHANCE THE ETHOS TYPOLOGY OF HOMELESSNESS?

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To the Faculty of Medicine, Dentistry and Nursing by
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Declaration

I declare that I am the author of this thesis and have consulted all references cited. I have carried out the work of which this thesis is a record. This work has not been previously accepted for a higher degree. The Scotland-wide data gathering was achieved in collaboration with Salaried Dental Service health professionals and staff at DHSRU.

Summary

The issue of healthcare provision for homeless people provides an ongoing concern throughout Scotland. Homeless people have been shown to experience high levels of ill-health, including oral diseases and are disproportionately affected by mental health problems.

This thesis sought to establish the health, oral health and psychosocial well-being needs of Scottish homeless people with a view to enhancing understanding, and providing a basis for improving models of care and service delivery for this group of vulnerable individuals. Two literature reviews were carried out, a narrative review of the available literature relevant to concepts of homelessness and relevant to the health of homeless people, and a structured review which allowed a detailed systematic examination of the literature specifically pertaining to the oral health of homeless people.

In order to provide greater context, the information gathered in this survey was evaluated against a framework of typology; typologies being frequently used to characterise homelessness. The ETHOS typology, internationally recognised and considered to be a valid and reliable construct of homelessness, was selected for use in this context of this thesis. Thus the aim was to investigate if oral health, health and psycho-social wellbeing could be used as additional descriptors of the ETHOS typology of homelessness for a Scotland-wide homeless population to inform the development of a tailored service provision to increase engagement with health services.

In order to achieve this aim, homeless people throughout seven NHS Boards in Scotland were sampled. Participants were asked to complete a questionnaire which assessed demography, general health and associated health-related behaviours, psycho-social wellbeing, oral health and oral health-related attitudes and behaviours. An oral

examination was conducted to evaluate the prevalence of obvious decay experience, levels of plaque present, oral mucosal disease, and denture wear.

Eight hundred and fifty three homeless people participated, 85% of whom had an oral examination. Using the data obtained it was possible to show that demographic, oral health, health and psycho-social wellbeing descriptors existed which could characterise the various dimensions of the ETHOS typology, allowing an enhanced ETHOS typology to be developed. It is recommended that this enhanced ETHOS typology could act as a framework against which targeted and tailored health service provision for specific groups of homeless people could be developed. It is proposed that such a tailored health service provision is necessary, and would allow health services to improve their engagement of homeless populations.

1.0 Introduction

Homeless people are said to face an everyday struggle to find basic elements of human necessity and comfort, such as shelter and nourishment [1]. Perhaps as a reaction to the stressful nature of homeless life, or due to destructive habits already established prior to their homelessness, many homeless people take refuge in unhealthy lifestyle choices such as alcohol, smoking and/or drug use [2]. Being homeless is an impoverishing and isolating experience, which presents those affected with many issues, which can directly impact upon, and potentially compromise, their health and oral health [3-11]. The homeless population as a group is often characterised by an increased prevalence of chaotic itinerant lifestyles [12, 13], deprivation [14], social exclusion [15], general ill health [1,10], and poor oral health [11].

The exceptional healthcare needs of homeless people in Scotland were recognised by the Scottish Executive, which in March 2005 produced a set of Health and Homeless Standards, a set of strategic standards [16], aimed at ensuring that the NHS Boards within Scotland gave special consideration to improving understanding, planning and treatment of the homeless within their NHS Board areas. There are six individual Standards focussed on aspects of service delivery for homeless people in Scotland, namely corporate planning, partnership working, evidence based service development, access to healthcare services, positive service response and effective implementation of the Health and Homelessness Action Plan [16].

The Scottish Executive had also recognised, as part of its 'Action Plan for Improving Oral Health and Modernising NHS Dental Services in Scotland' (Dental Action Plan) in 2005, that it would be desirable for NHS Boards to develop and implement oral health-care promotion for 'adults most in need'. Homeless people were categorised as one of the groups of 'adults most in need' in the Dental Action Plan [17].

In response to these Government directives, health policies and strategies have been developed throughout Scotland for homeless populations [16]. Each of the Local Authorities and National Health Service Boards in Scotland has, therefore, a statutory duty to implement a strategy for dealing with issues associated with homelessness, and these strategies include the distribution of advice and information regarding healthcare and dental services in the local area [16]. Throughout Scotland, access measures have been put in place to facilitate care for the homeless, with dental services often linked with medical service provision. These measures are aimed at improving uptake of dental services amongst homeless people, and run in tandem with the services offered by other NHS and private dental clinics.

Different NHS Board regions have taken different approaches, with a common aim of inclusion of homeless people within the context of dental care (see Appendix 9.1a, 9.1b and 9.1c). Many of the NHS Board regions are involved in the Scotland-wide initiative which is aimed at developing and implementing a novel nationwide dental service for homeless people.

The policies to promote health-care provision are multi-agency documents, and their implementation is effectively monitored by Communities Scotland, the Government and the Homelessness Monitoring Group [16]. The Scottish Government's acknowledgment of homeless people as group in need of special attention is a valuable reaction to the demands of the homeless lifestyle and the detrimental effects this lifestyle has on health and oral health [18].

In order to address the complexity of issues that provision of oral health services towards this socially excluded population create, an accurate evaluation of numbers of those who constitute the 'homeless' population and their needs, as related to the services planned for delivery, is required [18]. In 2004, the British Dental Association (BDA) published 'Dental Care for Homeless People' [18]. This BDA document recognised

the need to improve the delivery of dental care to homeless people, and as a first step it was suggested that a normative needs assessment be conducted in order to provide tailored dental services to meet the needs of people experiencing homelessness. This population-based approach is compliant with the British Dental Association's recommendations that homeless people be provided with 'accessible dental services based on local needs assessments' [18].

As the aim of this thesis is to characterise homeless people in terms of typology and health status, the optimum means by which a characterisation may be achieved must be examined. It has been acknowledged that one of the most apposite methods to characterise a population is to conduct a cross sectional survey with the largest possible population size, so that the validity and reliability of the findings are maximised [19] in order to gain an understanding of any client group. Consequently, there is a wealth of literature which focuses on homeless populations with a view of characterising them through description and typology. These characterisations of homelessness attempt to expose the heterogeneity of the so-called 'homeless' and range from simple descriptions to complex typologies. However, despite this range of characterisations of homelessness, there is little information which links oral health, health or psychosocial wellbeing as additional descriptors of typologies of homelessness. In essence, can oral health, health and/or psychosocial wellbeing be used as additional descriptors of homelessness typology?

It is proposed that an enhanced typology of homelessness that incorporates oral health, health and psycho-social factors might inform tailored health service provision with a view to increasing engagement of homeless people with health services.

The literature review, therefore, will to examine the concepts of homelessness, illustrate the heterogeneous nature of homeless populations, through an examination of the prevalence and incidence of homelessness, and explore the various definitions

and typologies which are used to characterise homelessness. This exploration will allow for an improved understanding of who homeless people are, reasons for homelessness, and the barriers which impede access to healthcare to understand the increased prevalence of physical and emotional ill-health.

A structured literature review will be conducted to answer the research question 'Does the empirical evidence show an association between oral health and homelessness? – This structured review will examine the literature in detail and critically evaluate it using a systematic approach in order to determine whether any existing literature characterises homeless populations in terms of their oral health.

Therefore, the narrative and structured reviews of the literature will provide an overview of what it means to be homeless in terms of concepts and typologies, pathways to homelessness, the health risks associated with homelessness and the oral ill-health suffered by those experiencing homelessness. This will allow a first stage in the process of the identification of potential and additional oral health, health and/or psychosocial wellbeing as descriptors of the various typologies of homelessness.

2.0 The Literature Review

2.0 The Literature Review

2.1 Homeless people: definitions, typologies, incidence and prevalence

The definitions of homelessness applied by various local and national organisations involved with delivering care to homeless people vary in accordance with legislation, health promotion initiative and common usage. For example the definition of homelessness, according to Section 24 of the Housing (Scotland) Act, 1987, and applied for the purpose of the Homeless Persons legislation is that:

> 'A person is considered as being homeless if they have no accommodation with the U.K. or elsewhere, or if they have accommodation, but are unable to occupy it [9, 14]'.

Whereas, for the purposes of the' Scottish Rough Sleepers' [20] Initiative Count', a slightly different definition was applied, as a rough sleeper was classed as being anyone who had slept: 'Outside in a place not specifically designed for human habitation at least once in the last seven days [20].

The working party for the Prevention of Social Inclusion of Homeless People in Northern Ireland, however, defined rough sleeping in the more general terms as a person 'sleeping in the open air [15]'.

More recently terms such as 'sofa surfer' have come into regular use to describe a homeless person who is:

> 'Not quite outcast enough to have resorted to sleeping under bridges, preferring instead to use up the hospitality of everyone they know in turn' [21].

The homeless charity, Crisis, considers several further definitions of homelessness as viable. These include the legally homeless i.e. those without accommodation that they are entitled to occupy. These homeless people may or may not be included in the

official figures, as they may not have applied to be classified as being homeless [22]. The 'statutory homeless', are those who have applied for assistance, and have been assessed as being unintentionally homeless and in priority need. Those who are both legally homeless and have successfully applied to the local authority to be classified as such are described as 'officially recognised as homeless people' [22].

The EU Social Inclusion Strategy re-defined homelessness examining a group referred to as 'rough sleepers'. They suggested that 'rough sleeping' or 'sleeping in uninhabitable improvised shelters' should be contained within a category of 'rooflessness' [23] who could be thought of in terms of experiencing 'absolute homelessness', i.e. without physical shelter.

Other descriptors have been used to define homelessness, for instance, those individuals who have been described as 'houseless'. People who experience 'houselessness' are said to be those living in temporary (e.g. 'sofa surfers') or sheltered accommodation, such as short-stay hostels or 'halfway house' lodgings, or living in inadequate, overcrowded or insecure or unfit housing [16].

The vagarities of language used in these definitions and descriptions of homelessness have created confusion, which has often result from prolonged debates regarding the nature of homelessness, as well as the people characterised and described as being homeless. These terms illustrate the heterogeneity of this group of people marginalised to the edge of society.

2.1.1 Profiles of homeless people: typologies and descriptors

The diverse nature of homeless populations creates a necessity for typologies, or classifications, of homelessness. These typologies are useful in terms of dividing the population into subgroups based on epidemiological, psychosocial, and environmental

requirements, which in turn function to facilitate service delivery to a difficult to access people through an improved understanding of the situational and environmental factors which affect their lifestyles. Typologies, therefore, are useful in recording diagnostic, prognostic and descriptive information in easily understood and accessible form [19].

Since different groups or organisations working with homeless people employ a range of definitions to describe homeless people with subtle differences, pan-national groups such as the European Federation of National Organisations Working with the Homeless (Feantsa) have attempted to classify 'homelessness'. Feantsa consider homelessness within a broad context encompassing those who are roofless, houseless, living in insecure accommodation, and those inadequately housed [8]. Feantsa subscribes to the European Typology of Homeless (ETHOS), as described above, which is thought to be inclusive, providing a true reflection of modern homelessness [8]. The ETHOS typology categorises homeless people in accordance with the accommodation-related descriptions as noted in Table 1.

The homeless experience does not tend to be static and can be conceptualised as a journey. This is echoed in the ETHOS typology, which may be thought of as a dynamic characterisation of homelessness. Homeless people have the potential for mobility between categories of the typology as their homeless experience progresses.

The ETHOS typology provides a useful tool for measuring homelessness and differentiating between different types of homelessness, and also provides comparable data, allowing for comparison among the various EU member states.

Table 1: European Typology of HOmelessnesS (ETHOS) [8]

	Conceptual Typology		Operational Category
Organisation: European Federation of National Organisations Working with the Homeless (Feantsa) [8]	Roofless	1	People living rough
		2	People in Night Shelters
	Houseless	3	People in homeless accommodation
		4	People in Women's Shelter
		5	People in accommodation for immigrants
		6	People due to be released from institutions
		7	People receiving support due to homelessness
	Insecure Housing	8	People in insecure accommodation
		9	People under threat of eviction
		10	People under threat of violence
	Inadequate Housing	11	People in temporary/non-standard structures
		12	People in unfit housing
		13	People in extreme overcrowding

Nevertheless, other typologies of homelessness have been developed, often having a basis in the causes of homelessness, and are used as descriptors of exclusion from society and resources (Table 2). These typologies include:

1. The disaffiliation-based typology [24], which refers to the method by which homelessness has occurred, therefore it describes how an individual can become detached from society, whether the basis for that detachment is the withdrawal of the individual from society or vice-versa. In either case society and the individual become disenfranchised with and disaffiliated from each other. An example of this is seen in the experience of chronic mental illness; sometimes this can result in an individual withdrawing from society, and becoming homeless as a result.

2. The trajectory-based typology [25] describes groups of homeless people in terms of how they physically entered the realm of homelessness. As a result there are sub-groups within this typology, such as 'street people' and 'shelter people'. The typology category is dependent on where the individual spends time as a homeless person.

3. The dichotomy-based homeless trajectory [26] descriptors are based on the duration of the homeless experience, splitting homeless people into two main categories: long term (or malignant) and short term (or benign) homeless. Describing homelessness in this way can be useful when evaluating the homeless person's likelihood of an effective return to the settled population.

4. The preventive-based typology [27] defines homelessness in terms of duration of homelessness, with the additional consideration of how deeply mired the individual or family has become in the homeless situation. This typology also is used with a view to re-homing the houseless, and examines facilitating factors, and factors acting as barriers to re-homing homeless people.

5. The career-based typology [28] of homelessness, as described by Mackenzie and Chamberlain [28], provides definition of the homeless experience in terms

of the pathways into and through homelessness. This allows examination of the root causes of homelessness and the effects of societal problems such as drug-related crime on the homeless population. In examining the cause and effect of homelessness this typology has elements in common with the trajectory-based typology [25], this typology focuses on causality, however, as opposed to descriptors.

6. The resource-based typology [29] of homelessness focuses solely on the effects of societal issues on homelessness, as opposed to descriptors of homeless causality, relating homelessness to the impacts of community and family/individual resources, and the reciprocal relationships between the homeless person and their surroundings.

Table 2: Typologies of homelessness

Typology	Typological Categories
Disaffiliation-based typology [24]	Society withdraws from individual (for example: economic depression) Individual withdraws from society (for example: dropping out of society) Individual '*unsocialisation*' (for example: disability/chronic illness)
Trajectory-based typology [25]	Street people Shelter people Resource people (Resource people being the 'hidden homeless' such as 'sofa surfers')
Dichotomy-based typology [26]	Benign Homelessness – short period of easily reversed, non-recurrent homelessness Malignant Homelessness – long-term or recurrent homelessness, where return to stable housing difficult to effect.
Preventive-based typology [27]	Prevention Typology Framework is based on the model that considers facilitators of and barriers to homelessness. Its purpose is to: rank families according to levels of risk of homelessness and probability of a quick exit from homelessness distinguish families in desperate need from those with more moderate needs.
Career-based typology [28]	Pathways to homelessness Housing crisis career Family breakdown career Youth homelessness career
Resource-based typology [29]	Resource Allocation Typology Exogenous (Housing environment, housing, and health and human service access) Endogenous (The family and individual characteristics, including family support needs, broad health needs, social needs, children's needs) Situational (The fit between the families' needs and accessible resources)

Therefore, when choosing which typology of homelessness to use, the way in which the typology is to be used may be directly relevant to the typology choice. For instance, certain typologies (e.g. the preventive-based typology) are relevant in terms of planning preventive interventions, while others (e.g. resource-based typology) are more useful when solving the problems to assist homeless people to find a home.

Some organisations choose to disregard typology descriptors and use broader, more ambiguous terms when describing homelessness. The United Nations [30, 31], for example, define homelessness in a holistic context, viewing it, not just from the perspective of the physical descriptive (e.g. houseless), but from the perspective of its impacts on the individual and their sense of place within the wider social context. In essence the United Nations classification takes into account the social isolation and social exclusion of a homeless individual. Therefore the homeless person is described as being:

> '[Detached] from society characterised by the lack of affiliative bonds that link people into their social structures [30, 31]'.

The United Nations' classification of homelessness [30, 31], therefore takes into account the social dimension as well as the vulnerable living environment, that many people and families, whilst not actually roofless, are living in. Thus, it shares commonalities with the Feantsa-ETHOS definition [8], which considers homelessness within a tripartite, interactive framework of the physical, social and legal aspects of having a home - the so-called domains of homelessness:

- The Physical Domain: the individual's home can be described as being a decent dwelling or space, adequate to meet the needs of the person
- The Social Domain: the individual's home is such that the individual can maintain privacy and enjoy social relations
- The Legal domain: The individual has exclusive possession of the home, and has security of occupation and possesses the legal title for the home [8].

The ETHOS domains of homelessness therefore constitute what is meant by a home in terms of its physical structure, as a place for social interaction and its legal requirements. For United Nations and Feantsa-ETHOS, it is the absence of any one of these domains, which increases the potential to be rendered homeless. The embracing of the 3 domains of homelessness as an explanatory framework to understand the risks and outcomes of homelessness also provides a means of identifying the true prevalence of homelessness. Moreover, It has been proposed that adopting the 3 domains of homelessness allows a clear visualisation of homelessness as an ongoing, dynamic process, emphasizing the reality that homelessness is not just limited to physical housing problems [8].

The 'United States Code' on homelessness, from America, differs from that of the United Nations and ETHOS. The United States Code uses an umbrella definition of homelessness which defines the individual experiencing homelessness as a person who:

> 'lacks a fixed, regular and adequate night time residence' or someone, whose night time residence is 'a shelter, an institution or a public space not designed for sleeping' [32].

The United States Code definition, unlike that of United Nations or ETHOS, is one-dimensional relying on the single issue of 'being without a home to sleep in' as being the demarcation between those who are and those who are not experiencing homelessness. The United States Code definition, therefore, has the tendency to exclude those people who are characterised as the hidden homeless and thus reducing the reporting of the true prevalence of homelessness. The United Nations and ETHOS definitions implicitly reject a one-dimensional definition of homelessness, which in their view, implies a stasis in the individual's homelessness status and ignores the dynamic quality as well as the understanding inherent within the typologies of homelessness.

2.1.2 Profile of homeless people: descriptors of homelessness

There exists, therefore, a wide variety of terminologies, typologies and descriptions of homelessness. Some descriptors are, however, useful as they describe some of the subgroups common to homeless populations, and are frequently used as a basis for defining homelessness for the purposes of surveys. Table 3 provides a list of descriptors and definitions of homelessness ranging from 'absolute homelessness' through to 'statutory homelessness'. The existence of such a multitude of definitions does not reflect confusion, instead providing acknowledgement that there are a variety of forms of homelessness that can be experienced, and that the so-called 'homeless' are in fact a diverse group of individuals, with homelessness at its most basic being considered as being 'without a home'.

Therefore, the way in which homelessness is categorised, can in addition provide descriptions of sub-groups of the homeless population, which may in turn affect the eligibility and priority with which homeless people are treated by the local authorities. This has been noted by the European Union's (EU) Social Inclusion Strategy, which comments on the lack of harmonised statistics; a product of the lack of clarity surrounding the definition of homelessness [23].

Table 3: Descriptors of homelessness [31, 33]

Descriptors of Homelessness	Definition
1. Absolute homeless	Individual with no home and no access to any form of shelter.
2. Chronic homeless	Long-term homeless
3. Hidden homeless	Individual who is homeless but does not appear on statistical surveys as they have not applied for or do not qualify for housing aid.
4. Houseless	Individual living in temporary or sheltered accommodation
5. Intentionally homeless	Individual who has voluntarily rendered themselves homeless
6. Invisible homeless	As for hidden homeless
7. Legally homeless	Individual without accommodation that they can legally occupy
8. Roofless	Individual sleeping in unfit or unsafe areas
9. Rough sleeper	Individual sleeping 'rough' on the streets
10. Sofa surfer	Individual who, although homeless, is 'doubling up' with family and friends, and so does not seek housing aid
11. Statutory homeless	Individual who has applied for assistance and has been assessed as having priority need
12. Visible homeless	Individuals leading an openly homeless existence on the streets

2.1.3 Profiles of homeless people: incidence and prevalence in Scotland

This section of the narrative review will focus and describe the incidence and prevalence of homelessness in the Scotland, demonstrating the effect of definition or typology upon statistics as an expression of shortcomings within the epidemiological data described. This will allow understanding of homelessness in the Scottish context.

The definitions, typologies, and descriptors of what constitutes homelessness are diverse. However, and more worryingly, they have the potential to alter the outcomes of homelessness surveys or counts, making it difficult to break down statistics into exact numbers of homeless individuals since there is the tendency to count 'households' as opposed to individuals. The agencies and organisations tasked with gathering statistics regarding numbers of homeless people, present within any given region, tend to use different descriptors and definitions of homelessness. Therefore, precise figures for homeless populations in any area are often difficult to ascertain.

2.1.31 Incidence of homelessness in Scotland

Since 2001, the data from applications to the local authorities in Scotland under the Homeless Persons' Legislation has been recorded in such a manner as to allow improved analysis for issues such as repeat applications, reasons for homeless and analysis of household composition. Prior to 2001 cases were only recorded after the case was closed, so the data captured was retrospective. Since 2001, a more continuous approach has been taken, meaning that the data is more up to date. Dramatic rises in numbers are visible, for example in the year 1989-90 there were 29,068 applications made, almost less than half of 52,120 in 2002-2004 [33]. The number of applications in 2008-2009 was 57,304 [34].

The levels of applications under this legislation are rising, and the statistics provided by this are one of the better indicators of levels of homelessness in Scotland (Table 4).

In the year 2003-2004, 56,696 households made applications to the local authorities in Scotland under the Homeless Persons legislation [20, 33]. This figure represents a nine percent increase in the estimated number of homeless in Scotland compared with the previous year. Glasgow, Edinburgh and Fife had the largest number of applications. These figures can be compared with 286,849 applications in England and 22,250 in Wales [33]. This is a particularly pertinent issue for the Scottish Government since it has been estimated there are growing numbers of homeless people in Scotland [20]. In 2003 it was estimated that there were at least 56,696 homeless people in Scotland [33]. The most recent figures from the year 2010-2011 show that 55,227 people applied to be considered as homeless, this in fact represented a small increase compared with 2009-2010 [34]. The number of households described by the local authorities as being homeless following assessment was 43,030 in 2003-2004 (Table 4). Households are classified as in priority need either if they have dependent children or if they are classified as 'vulnerable' [22]. Table 4 shows that the percentage of priority homeless has increased year on year. Fifty-six percent of people described as being homeless in 2003-2004 were considered to fall into the category of priority homeless. By 2010-2011 the number of households assessed as being homeless was 55,227 but those classified as priority homeless had risen to 88% [34].

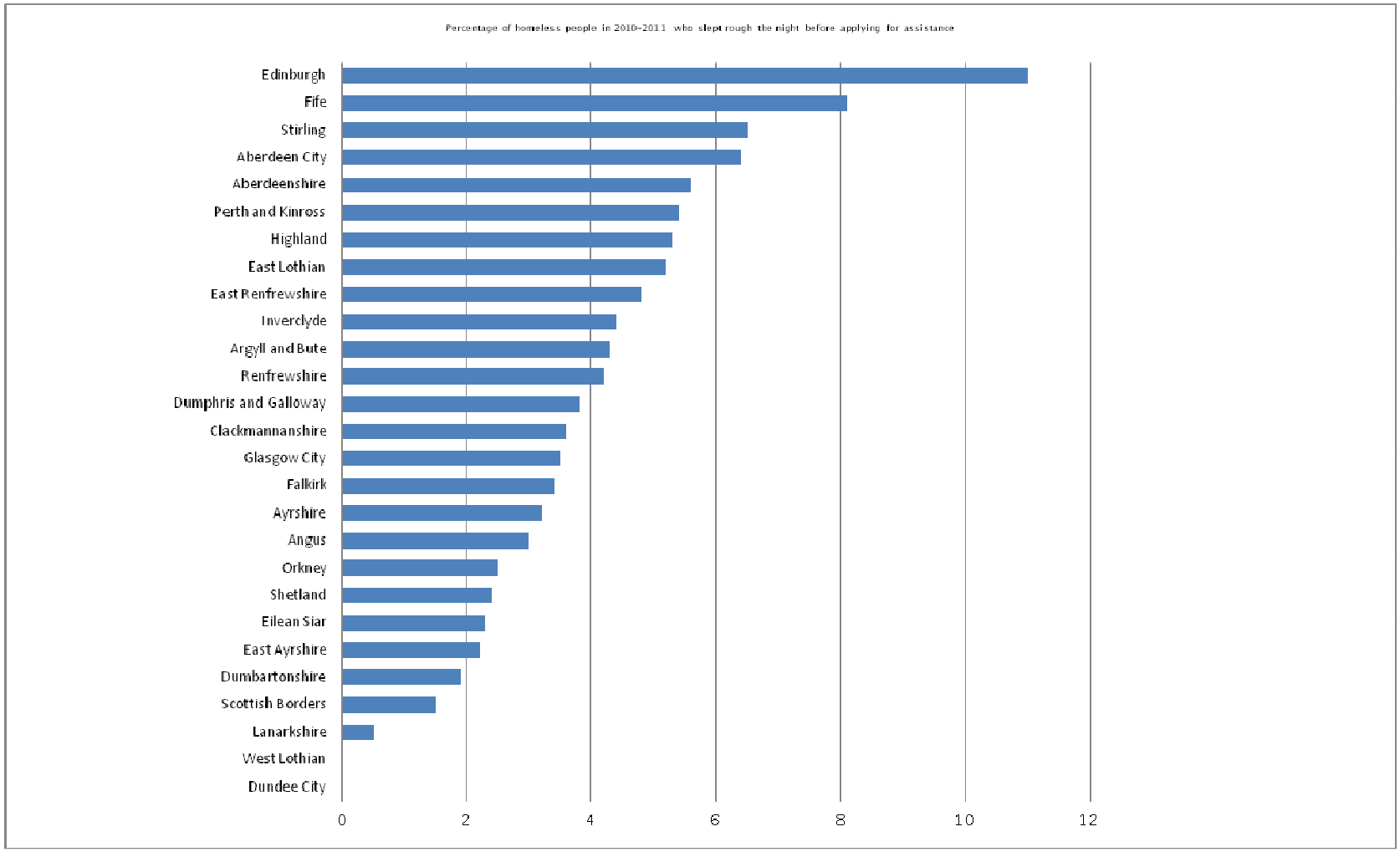
More accurate pictures of homelessness are provided by the kind of statistics provided by enterprises such as the Rough Sleepers Initiative in Scotland [20]. This scheme operated a biannual count of homeless in Scotland, since its inception in 1997, until its completion in 2003. In October 2003, the number of people sleeping rough throughout Scotland was recorded as 328 individuals, with the greatest concentration of these being in the cities of Glasgow and Edinburgh [20]. Figure 1 shows the 2010-2011 data on rough sleeping by council area in Scotland. This data is based on the number of people rough sleeping before asking for assistance.

Table 4: Households assessed as homeless or in priority need by local authority 1992-93 to 2010-11[34]:

	All Applications	Homeless		Priority Homeless	
		Number	Percentage of all applications	Number	Percentage of all applications
1992-1993	42,822	30,100	70	19,800	66
1993-1994	43,038	30,900	72	18,200	59
1994-1995	41,495	31,600	76	17,500	55
1995-1996	40,936	30,300	74	16,900	56
1996-1997	40,989	30,600	75	16,800	55
1997-1998	43,135	32,500	75	17,600	54
1998-1999	45,723	33,500	73	18,400	55
1999-2000	46,023	33,600	73	20,200	60
2000-2001	45,004	33,300	74	20,500	62
2001-2002	47,493	37,100	78	26,900	73
2002-2003	52,130	40,244	77	29,447	73
2003-2004	56,709	43,087	76	31,598	73
2004-2005	57,444	41,662	73	31,226	75
2005-2006	60,820	43,647	72	32,964	76
2006-2007	59,654	42,759	72	32,841	77
2007-2008	57,239	41,630	73	33,269	80
2008-2009	57,668	41,573	72	34,679	83
2009-2010	57,122	43,275	76	37,055	86
2010-2011	55,227	40,807	76	35,790	88

(Statistical Bulletin Housing Series Operation of the Homeless Persons Legislation in Scotland: National and Local Authority Analyses 2010-2011) [34]

Figure 1 Percentage of homeless applicants 2010–2011 who slept rough prior to asking for assistance [34]



The proportion of people rough sleeping in Scotland was in total 199 people per month in 2010-2011. Three hundred and thirty two people, however, in 2008-2009 were classified as being long-term rough sleepers [34]. These figures do not, of course, take into accounts forms of homelessness other than rough sleepers. Therefore, by the end of 2004, the, then, Scottish Executive estimated that 1,624 households were living in hostel accommodation [33]. Furthermore, 4,238 households were housed in longer stay temporary accommodation, i.e. temporary accommodation provided by local authorities, associations and private landlords [33]. By 2008-2009 10,053 households were in temporary accommodation [34]. This included long-term 'sofa surfers', those residing in hostels, bed and breakfast accommodation and caravans/mobile homes. Two thousand, three hundred and fifty-nine people leaving prison and 1,078 people from supported accommodation were homeless and applied for housing [34].

2.1.32 Prevalence of homelessness in Scotland

The charity 'Crisis' estimates current numbers of homeless in Scotland to be in the region of 59,000 [22] but, in common with other methods of estimating homelessness levels, these figures are likely to represent an estimate short of the true numbers, with the exact number of homeless people, present at any time in Scotland, being essentially unknown. The prevalence of homeless people is further elevated by those homeless living in insecure or inadequate housing. In addition, those who report to the authorities that they are threatened with homelessness in the near future, i.e. the potentially homeless, such as people living in women's refuges, reception centres for asylum seekers, and (youth) foyers. Furthermore, there is a group of people, whose numbers are very difficult, if not impossible, to ascertain. These are those without homes who are sleeping in different places from one night to the next, staying with friends, and known as sofa surfers for example. This latter group of people are accurately termed the 'hidden homeless'.

Since there are so many different categories or 'types' of homeless people, all living an alternate lifestyles, either through design or having been driven by circumstances - it remains impossible to assess the true prevalence of homeless people in Scotland.

2.1.4 In summary

The existence of a variety of definitions and descriptors of homelessness provides acknowledgement that there exists a diversity of forms of homelessness that can be experienced, that the homeless are a disparate group of individuals, with the most common meaning of the homeless experience being considered as being 'without a home'.

The technical descriptions are often used by local authorities and charities. It is increasingly acknowledged, however, that there is more depth to the concept of homelessness experience than the restrictive descriptors of 'rough sleeping' or 'absolute' homelessness. For example, the homeless experience can be broken down further in descriptive terminologies into the 'potential homeless', i.e. those threatened with homelessness within the near future (next two months [9]); the intentional homeless, who are defined as those who have deliberately rendered themselves homeless by:

> 'doing or failing to do something which led to the loss of accommodation' [9]

Additionally, the visible homeless [22], are those easily observed by society as they live an openly homeless existence. The invisible homeless person, or hidden homeless individual [22] may live a nomadic existence in common with 'other homeless' people, but do so as they move from one type of short-term insecure housing to another. The number of individuals affected by this type of homelessness is thus impossible to ascertain, as they avoid 'the system' rendering traditional methods of counting inapplicable. Furthermore, 'homelessness' is not always an absolute. It can be a

provisional, short-lived, or more long-term. It can be semi-permanent or a transient arrangement. Individuals can be considered as being 'new' homeless or 'old' homeless, depending on the duration of their homeless experience [35].

One of the features of homelessness is that it is not a static experience. Operating within such a transient framework there can be no single definition of homelessness applied as being completely apposite, nor can any true count of the homeless be made as so many disparate, nomadic individuals are affected within a variety of settings. It would follow therefore that if homelessness is a dynamic experience then people must experience various forms of homelessness, throughout their lives, as well as having different experiences of becoming homeless. The need to explore how social factors as described in the various typologies impact upon people's experience of social exclusion and how this affects their pathways to homelessness requires to be examined in order to appreciate the psycho-social dimensions of being a homeless person.

In summary, it is suggested that for the purposes of this thesis, the ETHOS typology [8] will be adopted since it provides the most comprehensive characterisation of what it means to be homeless while reflecting the dynamic nature of homelessness.

2.2 Homeless people, social exclusion and pathways to homelessness

2.2.1 Introduction

The degree to which an individual becomes socially excluded when homeless depends on the extent, depth and duration of their homeless experience. In addition the lifestyle context within which the homelessness occurs, along with the individual's age when this happens, are important indicators of social exclusion [36].

The links between health, homelessness and social exclusion will be examined in this section of the narrative review. This will permit an improved understanding of the

causes and effects, and impacts of homelessness which in turn will inform the content of a health descriptor for a typology of homelessness.

2.2.2 Social capital and social exclusion: definitions and concepts

The development of social capital as a concept has provided a means by which to examine the roots of successful communities, and other partnership working alliances such as civic programmes. The concept of social capital, where the informal relations or connections between individuals and people are viewed as being valuable sources of capital [37] has been advocated by theorists such as Bourdieu [38], Putnam [39, 40] and Coleman [41].

Bourdieu [38] differentiates between economic, cultural and social forms of capital, ascribing paramount importance to social capital with networking as its driver. Recognising the importance of networking, Bourdieu [38] describes creation of networks in deliberate terms, acknowledging that these valuable networks amongst families and friends in the community are not automatically created and are often consciously created or invested in by the members of the community.

Bourdieu [38], therefore, describes social capital in the context of social networks*:*

> 'Social capital is the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance and recognition – or in other words to membership of a group – which provides each of its members with the backing of the collectively owned capital, a 'credential' which entitles them to credit, in various senses of the word' [38].

Putman [40], however, provides an alternative explanation. Putman visualises social capital as being within the:

> ‘Features of social organisation that can improve the efficiency of society by facilitating co-ordinating actions’.

It is here that Putman [40], deviates in his opinion regarding social capital from that of Bourdieu. Unlike Bourdieu, Putman considers solidarity, equality, reciprocity and engagement as important constituents of social capital since these factors emphasise the role of networks in building social capital:

> ‘Social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them. In that sense social capital is closely related to what some have called “civic virtue.” The difference is that “social capital” calls attention to the fact that civic virtue is most powerful when embedded in a sense network of reciprocal social relations. A society of many virtuous but isolated individuals is not necessarily rich in social capital' [40].

A third theorist, Coleman [41] adopts yet another position. Coleman [41], emphasises the ‘facilitating economic capacity’ of social capital and suggests that social capital is a tool: ‘For use in the analysis of social systems’

Coleman [41], therefore, defines social capital, not primarily in terms of networks but in more wide-ranging terms of economic function and structure:

> 'Social capital is defined by its function. It is not a single entity, but a variety of different entities, having two characteristics in common: they all consist of some aspect of a social structure, and they facilitate certain actions of individuals who are within the structure'.

Although Coleman [41] applies the concept of social capital within an economic context, he appreciates that social capital is not limited in its use to this setting.

Coleman proposes that social capital can act in a variety of physical arenas, with its actions being channelled through the domains of participation, altruism, trust and sociability, which he theorises to be main domains of social capital.

Synthesising the views of these three theorists it is possible to consider social capital as the economic, cultural and social forms of capital which are relevant to the development of a community. Those communities with high levels of social capital being perceived as capable communities working well within the context of development. In this respect it may be postulated that this synthesis of the theoretical positions of Bourdieu [38], Putnam [39, 40] and Coleman [41], mirror the physical, social and legal domains of homelessness as described within the ETHOS typology of homelessness [8].

Islam *et al* [42] describe social capital in terms of vertical and horizontal parameters. Within Islam *et al*'s hegemony, three dimensions of social capital are said to exist, which conceptualise social capital in terms of vertical and horizontal networks. These are:

1. Bonding Social Capital:

   Bonding social capital is a reflection of the social cohesion within groups which is essential for getting by. It represents the exclusive networks within specific groups of people which are horizontal between equals. Therefore, bonding social capital is a horizontal form of social capital existing as a marker of family, group or community interaction.

2. Bridging Social Capital:

   Bridging social capital is also essential for getting on and reflects the inclusive social networks across different and distinct groups of people. It is considered to be a form of vertical social capital and is exemplified by the formation of networks with people from groups beyond an individual's immediate social group.

3. Linking Social Capital:

Linking social capital is a subtype of bridging social capital. It is a form of vertical social capital between groups of people of different socio-economic groups in which the vertical networks link the powerless to the powerful. In simple terms it reflects connections between unlike dissimilar people outside the general community group [43]. Linking social capital has been considered to be a reflection of the mutual trusting networks which must be in place to allow those who are socially excluded (powerless) to access health-care from professionals (powerful) [43].

The existence of social and trusting networks (social capital) within a society does not necessarily render these social networks accessible to all. In fact it could be argued that the positive gains advanced towards society by social capital networks, by their nature lead to increased isolation for those whose community participation is low. These so-called 'outsiders' become more isolated as they are left behind, with ever changing social networks acting as a constraints for inclusion [41].

Therefore, people who have little access to friends and family (bonding social capital) and/or who have little interaction with their neighbours or other groups of people (bridging social capital) and are disempowered with regard to accessing services (linking social capital) may experience such a degree of social isolation that they are said to be are affected by social exclusion. Social exclusion is a multi-dimensional definition of poverty [44], which may be considered the negative of social capital [43].

2.2.3 Social capital, social exclusion and homeless people

Groups of people affected by social exclusion are those who have impoverished social networks and include people experiencing homelessness. Homeless people, living on the edges of society, participate little and experience extreme isolation. Their isolated existence may be enhanced little by the fact that they may have loose ties with the

settled population in the area in which they exist. Since there are many aspects of the homeless person's life which are transient the opportunity for building mutually trusting networks with others is limited.

Therefore Burchardt [44], in his description of societal norms of participation in activities such as consumption of goods and services, saving money and property, engaging in socially valued activity, political activity, and social interaction with friends suggests that these actions all, necessarily, undertaken by those well integrated into society. For homeless people engaged in a daily struggle have little opportunity – whether in terms of trust or self-esteem – to access services which require empowerment and the ability to communicate with others or professional groups.

White [45] in an in-depth analysis of the concept of social exclusion identified four dimensions which illustrated the various aspects of society from which a homeless person would be excluded. These are:

1. Exclusion from civil society due to legal constraint or regulation e.g. those with a criminal record experiencing work restrictions.
2. Failure to supply social goods to a group with special needs e.g. appropriate accommodation for a family experiencing homelessness.
3. Exclusion from social production as a consequence of labelling groups such as those experiencing homelessness as 'undesirable'.
4. Economic exclusion from normal consumption, the lack of access to the normal work routines of life.

These dimensions of social exclusion can all be applied to those experiencing homelessness but different subgroups of homeless people, may be more affected than others as described by White's descriptors of social exclusion [37, 45]. It is likely that some of the heterogeneity evident within those experiencing homelessness, it may be proposed, is due to the varying degrees of social exclusion experienced by homeless

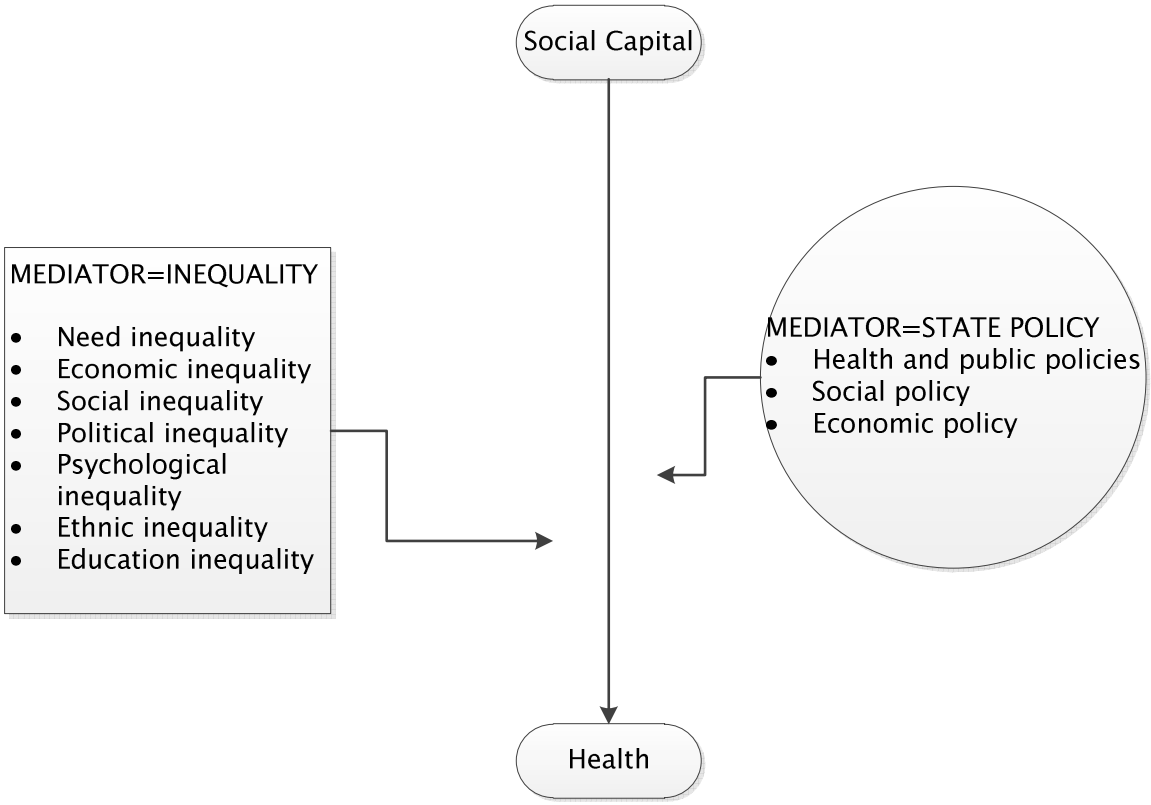
groups. The individual experiencing long-term or chronic homelessness, for example, has become increasingly isolated and experiencing a greater degree of social exclusion than others (e.g. statutory homeless), and will, in addition, be economically excluded from society. These variations often exist due to the particulars of the homeless lifestyle, such as described within the various typologies of homelessness, and the pathways taken into homelessness. The homeless experience therefore should be conceptualised and evaluated in the context of social exclusion since this will improve the understanding of what it means to experience homelessness and to be without a home.

2.2.4 Social capital, social exclusion and health inequalities

Putnam [46] suggested that a relationship existed between social capital, social exclusion and health inequalities with the degree of social capital experienced by an individual either ameliorating or exacerbating the individual's experience of health and illness.

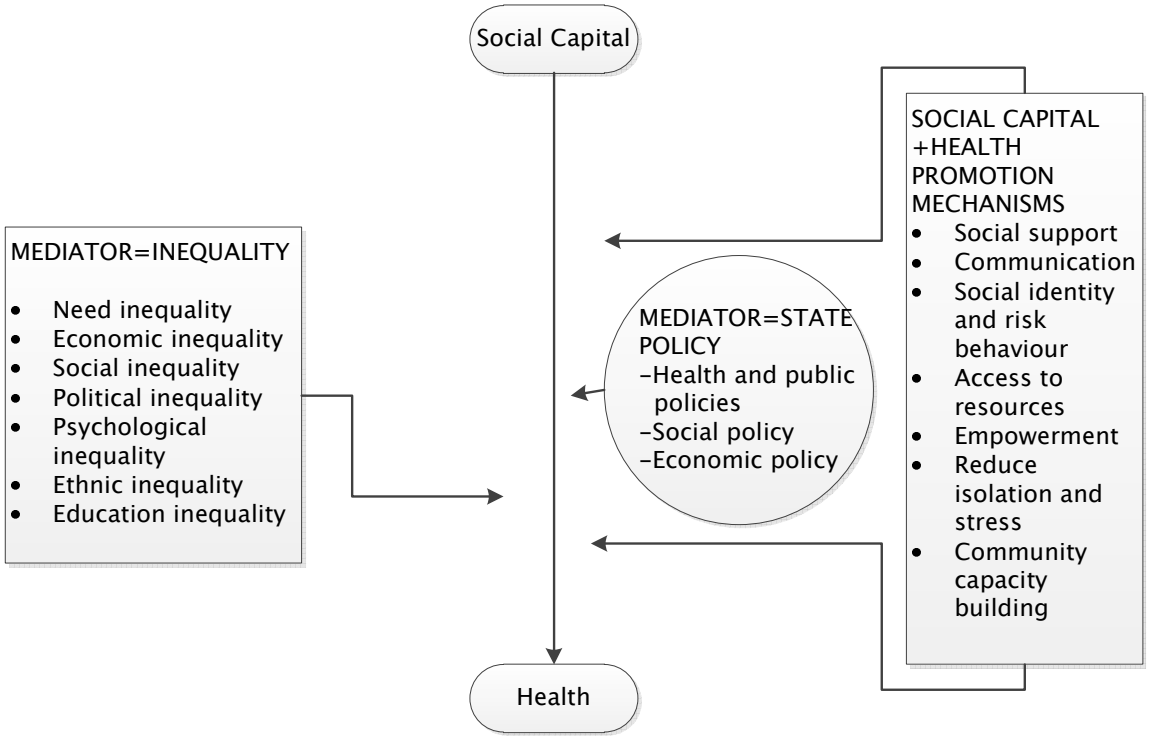
Putnam writing in 2004 [46], attempted to explain this interaction by suggesting that a complex interaction existed between social capital and health in which the State (external issues) and Inequality (internal issues) acted as mediators (Figure 2). These internal and external issues, according to Putnam, have the potential to have positive or negative impacts on the health of individuals within a community.

Figure 2: The relationship between social capital and health



These mediating factors, influence health through a number of mechanisms which are proposed to modify the effects of bridging and linking social capital upon health and inequality (Figure 3). The mediators are said to include social support, communication, social identity and risk behaviour, access to resources, empowerment, reduce isolation and stress and community capacity building [46].

Figure 3: The mechanisms to promote social capital and health



A homeless person who experiences ill-health, for example, will experience a greater morbidity of the disease process because (s)he may have little social support and may feel disempowered to access health-care services. In contrast, a person with increased bonding and bridging social capital will be in a position to communicate their concerns, seek advice and attend for treatment earlier than a homeless individual who has poor bonding, bridging and linking social capital. Therefore, bonding (e.g. social support) and linking (e.g. access to resources) social capital will have the potential to reduce or intensify the morbidity of the disease experience.

It is proposed that people experiencing homelessness have an increased risk of ill health due to their life and living circumstances which are characterised by social isolation, high-risk behaviours, disempowerment and a lack of mutually trusting networks which may result in delaying access to health services when appropriate.

2.2.5 Categorising homeless people in the light of social exclusion

As stated previously, there is the idea that people who experience homelessness have been considered to be a homogenous group; however, by acknowledging the heterogeneity inherent within the homelessness experience, the effect and influence of homelessness within the life course may be examined. The following section examines the influence of homelessness throughout the life course – from children to older people and the influence this has upon physical health and psycho-social well-being.

2.2.51 Homeless children

In the homeless setting, the lifestyle experienced by homeless children can be seen as one of the most isolating and impoverishing. Becoming homeless at a early stage in life can have a profound impact upon the child's physical and psychological development [36].

The child's physical and emotional development can be significantly affected or completely disrupted by the impacts of homelessness. Developing against a backdrop of poverty, instability and deprivation, which characterises the homeless experience, can destabilise the development of healthy behaviours and habits such as attendance at vaccination clinics healthy eating and oral hygiene, increasing experience of dental disease [47-49]. Thus the patterns of development associated with making relationships are disrupted and the opportunities for the consolidation of societal norms and values missed. The impoverishing effects of homelessness are magnified when a child experiences such poverty and instability, whether they are alone, as in the case of the homeless youth, or as part of a homeless family. Children's experience of homelessness contributes to a potential breakdown in the development of mutually trusting networks and acts to exacerbate the isolating effects of social exclusion.

Childhood experience of homelessness, has physical and psychological health consequences throughout the child's life [50]. The effect of being young and without a permanent home may increase the tendency for increased ill-health and the adoption of risk taking behaviours. Therefore the homeless lifestyle, for younger people will have consequences for their physical and psychological health as well as the adoption of health behaviours, all of which are developed during these early, formative years and retained throughout life, even if the child's housing situation improves.

2.2.52 Homeless families

The majority of homeless families, within the UK, are single-parent families and primarily consisting of women and their children fleeing abusive partners as a result of domestic violence [51]. Women fleeing from an abusive partner with her children ensure that they will be safe from physical, emotional and/or sexual abuse and enter women's refuge or place of safety [52].

Despite the woman's best intentions she may leave herself open to accusations of bringing her children into an unstable or unfit living environment of emergency shelters or bed and breakfast accommodation. The alternative option of leaving children in the care of relatives or friends brings the equally serious risk of being accused of abandonment. As a result, and in common with the homeless youths, the mother at the head of the abused family has often been left with no other option, effectively voluntarily rendering herself and her dependants into homelessness [50, 51]. Using the ETHOS [8] typologies of homelessness, such a family would be described as 'houseless' whereas using the Scottish Government's [16] descriptors of homelessness the woman and her children would be described, in addition to being 'houseless', as 'intentionally homeless'.

Perhaps because of the sense of vulnerability of the single-family and/or the decision to become homeless, this particular pathway into homeless may result in the family

being 'broken-up' with children forced into care or the family as a whole being re-housed in an unfamiliar area. With fears of discovery and the feeling of being an 'outsider', there is little opportunity for building trusting social networks. Consequently, there is the potential for social isolation and the detrimental effects of social exclusion upon the health of the parent and her children [39].

2.2.53 Homeless single people

The vast majority of the homeless people are adult men [53]. Single homeless women, are not only fewer in numbers, but also less visible on the streets and in hostels. Whether these findings by Casavant [53] and Tessler *et al* [54] are an accurate reflection of the gender difference in the prevalence of homeless people or whether it is because there are a reduced number of shelters and street services available to single female homeless, is a matter of some debate and once more raises the question with regard to the actual number of people who experience homelessness.

Another factor to be taken into consideration is the safety concerns of the single homeless individual. Single homeless people are frequently the victim of assaults and the unaccompanied homeless woman is arguably the most vulnerable to attack, particularly when sleeping rough. Ironically, single women (as mentioned in the previous section) have often been rendered homeless as a consequence of domestic violence, however, becoming homeless exposes them to the risk of more violence, perpetuating their fears and exacerbating their mental-ill health difficulties [55]. These social and health issues tend to dissuade the single homeless person from integration into a community, with anxiety and depression acting as significant barriers to inclusion [55].

A group of single people who are included within those categorised as socially excluded are migrant workers. The migrant worker often experiences homelessness as a result of insecure work, paying the gang master and sending large portions of their

income home to support relatives. When their employment is terminated, their accommodation is lost and with little access to money or savings to purchase a ticket home they become homeless [51].

2.2.54 Homeless 'older' people

Older homeless people may be thought of as the public face of homelessness. The image of the long-term homeless man tends to conform to a national stereotypical homeless conception. However, this is a misconception. 'Older' homeless people are the most visible group of homeless people, hence the stereotypical 'bag-lady' or park vagrant image, their health and appearance having suffered as a result of their unstable lifestyle [57]. The majority of 'older' homeless people are not new to the homeless life and have been living a vagrant existence for years. Interestingly, there are now, sheltered accommodations and care homes specifically available to this group of people experiencing homelessness [57].

Although many 'older' homeless people may be categorised as 'chronically homeless' there are a group of older people who despite the apparent abundance of accommodation options for this age group, are in a vulnerable housing situation, which is exacerbated by the current economic recession [57]. For instance, with ever-increasing fuel bills create financial problems for older people who are reliant on their fairly static pension. The most obvious impact of is the creation of 'fuel poverty', and as with other vulnerable groups, a combination of events can act to destabilise their housing situation.

'Older' homeless people are those most keenly affected by health problems, often building up at least partly as a result of their chronic vagrancy and long-term smoking and alcohol-related problems. However, although the 'bag-lady' may appear as 'older', she may not be as old as she looks. In chronological and societal terms the so-called 'older' homeless person is actually relatively young. The homeless experience is

detrimental to both health and life expectancy, with studies showing an average lifespan of forty-two years [58] for those experiencing homelessness compared with the normative lifespan for the UK population of 77 years [59]. Therefore the 'older' homeless person in terms of society as a whole is in fact entering middle-age.

Chronic homelessness [60] is said to be associated with vagrancy, mental ill-health, addictions and the experience of such intractable material and emotional poverty confers the greatest degree of isolation and social exclusion upon this group of homeless people. Consequently, the impacts of social exclusion on health such as the ability to access health services are magnified resulting in poor quality of life and reduced life expectancy.

2.2.55 Categorising homeless people in the light of social exclusion: concluding comments

The experience of homelessness is, therefore, detrimental to health at every stage throughout the life course. It may be suggested that in childhood exposure to risk taking behaviours and instability in family life results in a poverty not just in material terms but also with regard to the ability to cope with stress and emotional difficulties. Young people growing in this impoverished world may adopt risk taking behaviours, increasingly experience society in a cloak of mistrust. This sets the scene for the young person to become ever-more isolated and excluded as they start on a pathway into the world of homelessness.

2.2.6 Pathways to homelessness in the light of social exclusion.

Considering the effects of homelessness upon the life course, homelessness has been described as being a 'career process' [28, 61] which is conceptualised as the inevitable path towards homelessness, but in its correct context this descriptor can be employed to enable a model of 'homeless phasing' to be envisaged where intervention and

prevention can be successfully employed during periods of relative stability. Homelessness, therefore, can be conceptualised in terms of its dynamism; with the individual's homeless situation being perceived as being in a state of flux. Mayock aptly uses the term 'career' to describe the turbulent pathways to and through homelessness taken by the younger homeless people [61].

Therefore, in common with the variety of ways in which the homeless can be defined, there are said to be a number of ways in which people can be rendered homeless [11].

2.2.61 Pathways to homelessness: mental ill-health

Everyone is vulnerable to homelessness, though undoubtedly some are much closer to the edge than others. It has been estimated that the average person is only two pay-cheques away from homelessness [62]. Not everyone however, becomes homeless. An individual's psychological coping skills, social contacts, mutually trusting networks and organisational skills all play a part in preventing them entering a pathway into homelessness. The possession of emotional strength and social expertise (social capital) will have a positive effect - in other words the potential for homelessness can be mediated by the mechanisms known to intervene between social capital, social exclusion and health. Therefore it may be suggested that a continuum exists between those who cope in the face of adversity and who do not.

Frequently people who experience social isolation and who are faced with a myriad of problems lose their accommodation, due to the occurrence of apparent manageable but additional problems. Unable to cope with the stress of small debts, for example, they may be left unattended and as the situation becomes unbearable the individual becomes ever more isolation, adopts risk-taking behaviours and becomes homelessness. This proposition, that it is an individual's ability to cope with stressful life events, is supported by the work of Sullivan *et al* [63]. They suggest that mental ill-health increases the risk of someone becoming homeless but it is the combination

of risk factors of childhood deprivation and disruption which provide the impetus for homelessness. Therefore Sullivan *et al* [63] state that:

> 'Taken as a whole, our analyses do not support the notion that mental illness represents a distinctive pathway to homelessness but rather that the relationship between mental illness and homelessness is both complex and dynamic.'

In summary, people with mental ill-health, who have experienced considerable deprivation and disruption in childhood, are those unable to cope with the daily struggles of life and may be propelled into homelessness. Their emotional difficulties when coping with life's stresses and the adoption of risk-taking behaviours result in them entering a pathway to homelessness from which it is difficult to escape [64, 65].

2.2.62 Pathways to homelessness: reciprocity.

Reciprocity exists for many of the causes and effects of homelessness such as poverty and/or involvement with drugs and criminality [66] in the sense that in addition to a factor being a cause of homelessness it can equally be an effect of homelessness. For example, criminality can be a pathway into homelessness (e.g. loss of accommodation following incarceration or homelessness on release from prison [67]). Equally, homeless people are frequently forced to consider illegal actions as a way of obtaining food or other resources. In addition, they tend, through their life on the streets, to have contact with the type of people who conduct their business on the street – such as drug dealers. This provides the vulnerable homeless person with easy access to drugs and cheap alcohol, substance abuse being the means by which homeless people cope, and blunt the pain of a harsh reality [61].

Mayock and O'Sullivan's [61] conversations with homeless youth in Dublin illustrate the role of reciprocity as a pathway to homelessness, as these young people describe the ease with which they slipped into illegal drug dealing whilst homeless. For some,

avoidance of these behaviours whilst living on the streets was more difficult than adopting them, because apart from the usual peer-pressure, threats of violence were implicit for those who refused involvement [61].

The same reciprocal relationship is true for ill-health, with illness having the potential to act as an entry point on a route to homelessness as well as being a effect of homelessness: the health of the homeless person often deteriorating as their living conditions fall far below the ideal [68, 69].

2.2.63 Pathways to homelessness: relationship breakdown.

A common example of a pathway to homelessness is relationship breakdown [11]. Mayock and O'Sullivan [61], in their work with homeless young people convincingly showed that although an adolescent has left the family home due to disagreements (s)he remains in touch with, their parents returning when the conflict is resolved. The existence of close ties with family members has the potential to alter the outcomes for the young homeless runaway with many young people vacillating between homelessness and the family home [61].

The trigger for the shift towards homelessness can be an unsettled home life where intolerable situations in the home mean that self imposed exile is a better solution. It may happen as a result of difficulties encountered during the adolescent struggle, or getting in with a 'crowd' who act to encourage the individual to join them in their homeless lifestyle. This pathway to homelessness is linked with petty crime, drugs or alcohol. This can be considered as being similar to becoming involved with a gang; in the same manner that an adolescent who is affected by gang intimidation or violence can end up joining that gang as a self-protective reaction. Alternatively, those who observe homelessness can see that as being a 'cool' lifestyle to follow [61].

Other pathways to homelessness can be less predictable, for example relationship breakdown can often lead to one of the partners having to leave the shared home [54] as a result of violent behaviour as mentioned previously in women and their who become intentionally homeless as a consequence of abusive partners.

2.2.64 Pathways to homelessness: unemployment and financial hardship

Homelessness can conversely be conceived of in terms of being a downward spiral, i.e. a 'spiral of descent' into homelessness from a previously stable settled existence. The trigger for this pathway can be an external impact, outside the control of the individual affected. An example of this would be where someone who has held a steady job loses the job then loses their home shortly afterward as their income dries up. The pathway to homelessness from this point of unemployment can be a straightforward 'direct' consequence of job loss as described above, or it can be a convoluted process with several progressions and regressions (or recoveries) along the road to homelessness, mirroring periods of employment and unemployment.

Whilst there are many paths to homelessness there are some commonalities linking these paths. Intractable poverty offers one of the main threats in this context, with a number of the followers of pathways into homelessness distinguishable by their indigenous status [49]. Financial hardship is often a recurring theme in rendering people homeless [52, 53]. Many people, including families, can be considered as being at risk of homelessness, by virtue of their circumstances, financial or otherwise, which leads to them becoming unable to afford to access housing [54].

In the case of older people, in general, and homeless people, in particular, lack of money in conjunction with the loss of social contacts, and other emotional traumas can combine with physical factors such as the onset of acute infections, memory loss to affect their ability to cope [57, 70]. Financial issues, therefore, act in a synergistic

manner, with the co-morbidities of older age to hasten a descent towards homelessness in those vulnerable to emotional distress [43, 44].

2.2.65 Pathways to homelessness: crime and imprisonment.

About a third of prisoners prior to release stated that they had nowhere to live [71]. The pathway to and from crime and prison to homelessness, however, is a complex journey. Kushel *et al* [67] suggest that within the prison population there are higher numbers of people who are experiencing homelessness. Moreover those who have been in prison have a higher propensity to become homeless on release. In agreement with Sullivan *et al* [63], Kushel *et al* [67] propose that it is the childhood experiences of 'deprivation and disruption' and current risk-taking behaviours which act as precipitants to conviction and custodial sentences. Therefore, on being released from prison with nowhere to go, the vulnerable individual may return to old ways and become associated with drugs and/or alcohol misuse, or as a result of other links with criminality [65], return to prison. To quote Kushel *et al* [67] there is a 'revolving door' between prison and homelessness and prison:

> 'The association between homelessness and imprisonment is bidirectional: imprisonment may precipitate homelessness by disrupting family and community contacts and by decreasing employment and housing prospects'.

This complex pathway into and out of homelessness has been described by Seymour [72] as 'the recurring cycle' and supporting Kushel *et al* [67]. Seymour [72] states that a time in prison increases the probability of entering into a state of chronic homelessness since time in prison is associated with increased difficulties in reintegrating into society since the inmate has become more reliant and dependent upon routines during their time of imprisonment. When this is coupled with difficulties in finding housing and work, the likelihood for homelessness becomes greatly increased.

2.2.66 Pathways to homelessness: gender dimensions.

Patterns can repeat themselves in the various pathways to homelessness with commonalities evident in the ways that different individuals describe their own journey into homelessness. When asked to what they attribute their homeless status, male respondents tended to cite job loss, release from institutions such as prison, mental ill health and alcohol as the main triggers for homelessness [54]. The men's answers tending towards money related or financial factors, with the women more likely to attribute their homelessness to a breakdown-like schism with those who previously supported them, i.e. a loss of social support or emotional links [64].

As mentioned previously, and included here for completeness, women tend to attribute their pathways to homelessness as a result of relationship conflict, and withdrawal of help from those close to them [54]. Women's responses provide an interesting insight into how the homeless themselves perceive their own descent into homelessness [64].

2.2.67 Pathways to homelessness lifestyle choices

There are some homeless people who claim to have chosen their lifestyle [4]. They may have developed friendships with people who are already homeless and, having become involved in such a way, developed such strong ties to the homeless community in a certain area, may elect to render themselves homeless. Those reporting becoming homeless in this manner describe it in nonchalant terms of a smooth, apparently inevitable transition into homelessness, where it seemed more sensible to give up their settled existence and accommodation as they were spending most of their time away from their home anyway. For these people the links with their homeless friends were stronger than their connections to family or settled friends, so entry into the homeless community seems manifest rather than illogical. Their lives already contained such hardship that the difficulties of a homeless existence did not appear to be any great sacrifice by comparison [11].

However, voluntary homelessness is not the norm and intentionally or willingly making oneself homeless is rare [28]. It could be possible that some of those who claim to have become voluntarily homeless had, in reality little choice and elected to describe themselves in such terms as a way of taking ownership of their lives, or protectively covering up their true emotions.

The vast majority of homeless people have become so because of changes inflicted upon them by circumstance [28]. It could be argued that sometimes ill-advised life choices have consequences, one of which can be homelessness, and people can thus contribute to their homeless status. In reality, these consequences are not always easily foreseeable, nor are they always straightforwardly preventable.

2.2.7 Conclusions

Different people are affected by social exclusion in differing ways, dependent on their individual circumstances. The extent to which they are affected is relevant to their economic status, health status social relations and other factors such as immigration. The varying degrees of social exclusion and reduced social capital experienced by these groups of people have the potential to assist in an improved understanding of the heterogeneity which exists within homeless populations.

With regard to pathways to homelessness, these should not be regarded as a road to some inescapable fate, but should be seen as a two way street, where there is potential for prevention but which is unpredictable, due to the homeless person's fluctuant lifestyle. Homelessness is, therefore, not perceived as an inevitable outcome following a predictable downward descent into homelessness, rather it is perceived as being a reversible process, with the potential for intervention and change. This new conceptualisation of homelessness is used to differentiate and categorise homeless people into those who are 'chronically homeless' (for example, older homeless people),

the ‘cyclically homeless’ (for example, prisoners) and the ‘temporarily homeless’ (for example, women escaping abusive relationships) [68].

The existence, therefore, of a variety of pathways to homelessness results in homelessness affecting a great variety of people, with differing impacts, with the result being a diverse population of disparate individuals affected by similarly harsh circumstances. There are themes common to experience of this disparate set of individuals, which can be seen to contribute to their homeless status. Destitution and displacement are the main common denominators, but other issues present with great regularity: a lack of support from family [54], a lack of support from authorities [57], and a lack of knowledge on how to access available support structures [57]. Pathways in and out of homelessness have the potential to impact on the homeless person’s health and health-care provision and an understanding of that homeless individual’s trajectory through homelessness can help with health-care planning.

2.3 General health of the homeless populations

2.3.1 Introduction

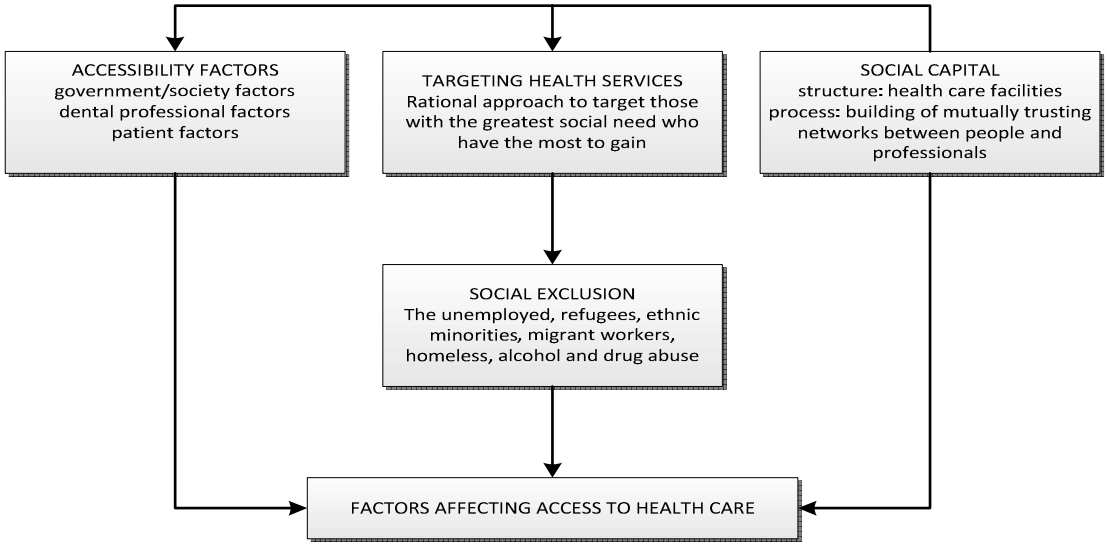
The poorer level of general health which affects homeless people is said to be due to a factors, which combine and act to form barriers to health care access and provision. Therefore in order to understand the relationship with regard to accessing health-care it is necessary to examine the homeless individual’s health as well as their experience of health-care. This section, therefore, aims to provide an overview of the relationship between homelessness, health and health-care. A brief synopsis to illustrate the effect of homelessness upon access to health-care, physical and psychological health and social well-being will be presented.

2.3.2 Access to healthcare

As early as 1990, Weitzman *et al* [50] proposed that the homeless person who had no apparent daily routines and little physical comforts, would leave relatively minor medical problems unattended. The health problem, Weitzman *et al* [50] suggested, needed to escalate and the symptoms to become increasingly acute before the homeless person would be in a position to address it. Consequently, Weitzman *et al* [45] proposed that the pain and discomfort threshold was much higher for some who experienced homelessness than for the housed, settled individual. Cattell [73] agreed and suggested, that for homeless people the worse their social conditions the greater the levels of ill-health experienced, and in keeping with and to paraphrase Hart [74] the treatment received was less and not commensurate with their degree of need. Welsh and Pringle's [75] tripartite formulation of social capital further supported the suggestion that social exclusion acted as a key factor with regard to homeless people accessing health-care services.

Figure 4 [76] is a modified version of Welsh and Pringle's [75] framework regarding the relationship between accessibility factors [77] targeting of health services, social capital and accessing health-care. Inherent in the structure of social capital with regard to accessing health services are the key and complementary elements of structure and process. Since structure provides an opportunity for social networks and process is related to the health behaviours undertaken by an individual then it is the combination of structure and process which allows an understanding as to why homeless people do not access health-care – it is the lack of mutually trusting networks which act as a profound barrier to accessing and the appropriate use of health services [78].

Figure 4: A tripartite structure to explain factors affecting access to health-care for homeless people [76]



The lack of mutually trusting networks, the lack of accessible health-care facilities and routine services, in essence means that people experiencing homelessness are not empowered to access care and this acts as a direct threat to health [50]. Homeless individuals who experience ill-health, therefore present with acute medical problems, exacerbated by delays in seeking medical care [51]. Therefore it has been suggested by Hwang *et al* [79] that medical services are accessed when the health problem becomes a priority, outweighing all other day-to-day issues which, in the case of the homeless, can mean the difference between eating or not eating or finding somewhere safe to sleep for the night.

In addition to this altered significance and differing set of priorities with regard to healthcare access, homeless people tend to view the 'system' with mistrust, often as a result of previous negative dealings with authority figures and legal and medical systems [80]. They tend to avoid interfacing with the authorities wherever possible, and as they view the medical establishment with the same mistrust, carry this

avoidance through to their dealings with health professionals [53]. In the same way, many homeless people have experienced prejudice in the past when seeking medical care, both in hospital and general practice settings. They report discriminatory treatment prompted by such factors as their appearance or medical history details [2] and concerns regarding confidentiality. Beaulieu *et al* [78] would perceive this as a lack of mutually trusting networks as a consequence of a lack of structure and process with regard to accessing health-care.

Such experiences do not encourage them to seek medical care again, as they have no desire to repeat such a negative encounter. These experiences act as perceived barriers to care, where subsequent to such an experience, the homeless individual delays seeking medical care due to their lack of understanding of systems or their reluctance to interact with the system [53].

For certain categories of homeless individuals who have become isolated from society, who live on the margins of that society, with apparent minimum routines and an absence of trusting social networks the diagnosis of physical ailments may be delayed and impeded by a lack of health knowledge on the part of the individual [81]. The role of health literacy is increasingly being shown to act as a barrier to care and conspires against some homeless people, accessing health-care. Poverty, poor health literacy, lack of access to accessible health information may have a indirect, detrimental effect on health [65].

A combination of a number of disadvantageous factors, therefore, conspires and reduces the quality of life and diminishes life expectancy for those experiencing some forms of chronic homelessness [82]. The projected lifespan for those experiencing homelessness is now accepted as being much lower than for the settled population [83].

2.3.3 Physical health

Studies investigating the impact of homelessness on health have shown that the levels of disease experienced by homeless people reflects the degree to which the individual is isolated from society [84].

Medical problems experienced by homeless people often occur earlier in the life cycle when compared with the general population, and this is particularly true for those who experience childhood and/or adolescent homelessness when deprivation impacts upon growth and maturational factors which determine long-term health [54, 57]. As mentioned earlier poor diet, lack of immunisation against childhood infections, and exposure to a high-stress environment all have consequences for physical health status in later life [41-43]. Nonetheless, according to Berman *et al* [52] the increased prevalence of ill health in young homeless people is a result of the young homeless person being unable to access information and to use social networks to facilitate diagnosis, attend health services and recovery from illness [61].

Homeless people have a higher experience of disease compared their settled counterparts, with some studies showing that over 50 percent of homeless people suffering from serious health conditions such as asthma or Chronic Obstructive Pulmonary Disease, and substance abuse-related illnesses [24]. Although, homeless people are a disparate and heterogeneous group, there are a range of health issues that have been shown consistently to affect larger numbers of homeless individuals compared with the population at large. These conditions include cardiovascular disease and mental illness [2, 13, 18, 85, 86].

The incidence of concomitant illness is also high within homeless populations, with 18 percent of homeless people having been found to be suffering from four or more serious illnesses at a given time [30].

Homeless people typically experience foot problems, such as trench foot, which are not otherwise common in the general population. This is due to a combination of poor hygiene, lack of clean clothing and feet, which are continually exposed to damp conditions [13]. Ill-fitting shoes, combined the fact that they tend to be ambulatory for long periods during the day, conspire to increase the homeless' suffering of painful foot conditions such as blisters or bunions. Further, experience of diabetes and other illnesses requiring long term management, can render the homeless person susceptible to sequelae such as tissue necrosis, which arise due to limited self management of their condition [13].

Outcomes of treatment in disease intervention often depend on awareness, early intervention, or better still, prevention. These factors, acting as barriers, and working in tandem with the detrimental effects of social exclusion as described above, can have a profound impact on treatment outcomes. Homelessness also has an impact upon the recovery from disease. Thus, acute flare-ups of chronic illnesses are common, leading to an over-dependence on emergency services [83]. This dependency has a detrimental effect on health and continuity of care, setting up a vicious circle of inappropriate healthcare use and acute exacerbations of chronic ill health [36].

Therefore, it may be suggested, that in the same way there is a heterogeneity in those who experience homelessness, there is also a variation in the degree of ill health experienced by those characterised as homeless [48]. Not all homeless people experience social isolation to the same degree as others – there are some who have poorer bonding (family ties), bridging (community ties) and linking (access to health services) social capital and are thus more isolated and so have an increased disease experience [2, 87].

As Putnam [46] has proposed it is the mechanisms of isolation, poorer communication, social identity together with an inability to access health-care, due to feelings of mistrust and disempowerment, which influence the relationship between homelessness and physical illness. Consequently, being socially excluded [42,46] means that homeless individuals' communications and social interactions with people in their communities are reduced, and there is an inefficacy or lack mutually trust in any potential support network. Thus homelessness and the social exclusion and isolation that comes in its wake, are essential criteria for the homeless person to have an increased experience of ill health and protracted recovery from disease [79, 88]. Therefore, social exclusion, together with feelings of disempowerment and perceptions of discrimination [89] means that social networks are impoverishment rendering social exclusion as an increasingly important factor impacting upon the disease experience of homeless people [43].

2.3.31 Physical health: environmental impacts

The lack of basic life essentials experienced by homeless people has the potential to impact upon their health in other more esoteric ways. In describing the needs of the individual and ranking them in order of the potency, Maslow [90] postulated that these needs could be placed in a hierarchy, with the more primitive needs, forming the lower tiers of the hierarchy, requiring fulfilment before other need can be addressed or met. In this hierarchical view Maslow postulates that basic physiological needs must be met in order for the individual to be able to focus on other issues, such as security of resources and needs relevant to health.

Sub-standard living conditions, for instance, where damp and mould breed may lead to a high incidence of respiratory diseases, particularly in the winter months. Cramped, unfit for habitation makeshift shelters, or derelict buildings are detrimental to health and in such conditions, where people are living together in close proximity, infectious

diseases, like tuberculosis can spread quickly [91]. The lack of sanitation facilities results in poor hygiene which may promote the spread of parasites and infections [13]. Therefore the lack of basic resources may assist in further explaining why some homeless people attribute a low priority to their health needs.

2.3.4 Psychological health and social wellbeing

The impact of stress upon psychological health is well documented and considered as important in both the incidence of disease and the recovery from illness [92].

Homeless people experience a high degree of stress. One of the factors contributing to these stress levels is the constant threat of attack from random passers-by or from 'other homeless' people in disputes over territory or competition for shared resources or possessions. This high experience of violent attack is another reason why homeless people tend to have a high usage of emergency healthcare. It also explains why the long-term homeless tend to withdraw further and further from society as their negative experiences render them mistrustful of others and drive them away from society, contributing to their experience of social exclusion.

Studies have shown that there is a high incidence of mental illness in homeless populations [61, 65, 86, 93]. It is conceivable that individuals, who in previous years would have been institutionalised, now live on the streets due to their reduced capacity to interact with society, and conform to the expected societal norms and standards.

The relationship between mental ill-health and homelessness is a reciprocal affair, with mental health being related to both the cause and effects of homelessness. In this context, there are associations to be made to the mental health of those individuals affected by homelessness. Certainly there is a high degree of reciprocity between experience of homelessness and experience of mental ill-health [65]. Questions

remain, however, as to which is the causal factor and which is the outcome. Does mental illness predispose to homelessness, or does the homeless experience place such stress on an individual that their mental health is at risk? Despite clear evidence of a high incidence of mental disease amongst homeless populations [55, 59, 81, 86], the exact relationship between these issues remains unresolved.

The symptoms of depressive and psychotic illness have been shown to be linked with homelessness and quality of life [89]. Improvement in quality of life, as related to a reduction in the period of time spent as homeless, has been shown to correlate with a reduction in the symptoms of psychotic and/or depressive illness. The duration of the homeless experience is considered as being a modifying factor in the extent to which psychological illness impacts upon homeless people, in particular homeless youths [95]. It has been estimated that major depressive illness affects up to 42% of the homeless population [7]

2.3.41 Substance misuse

Homeless people have a high incidence of high risk behaviours, which they may have adopted as a reaction to emotional difficulties and/or stressful lifestyles which may have contributed to rendering them homeless in the first instance. Contact with others in the same situation as themselves can also be damaging to the health of the homeless person, when this contact exposes or introduces them to drug use, or other substance misuse behaviours, such as smoking [10]. Drug dependence affects up to 54% of homeless people [7]. Shared needles and other high-risk behaviours, such as habitual drug use, can lead to transmission of blood-borne viruses such as HIV and Hepatitis [96]. In common with other factors such as depression and poverty, there is a reciprocal relationship between substance misuse and homelessness, with some people finding themselves homeless through drug or alcohol use, and others turning to drugs or alcohol because of, or as a result of exposure to drugs or alcohol during the homeless experience.

Unfortunately, these behaviours which are frequently used as a coping mechanism can also lead to reduced life expectancy. Abuse of drugs, alcohol and smoking are detrimental to health and undoubtedly contribute to the reduced life expectancy observed in this group of individuals [95, 97].

2.3.5 Conclusion

Therefore, in conclusion, whether or not those affected by homelessness are young, single or part of a homeless family the homeless lifestyle exacts a price. The impact of social exclusion on health behaviours, ill-health experience and provision of health-care for homeless populations is profound and is challenging to overcome. The life experiences of homeless people and the homeless lifestyle can act as barriers to care. In provision of health-care to overcome these barriers must be developed. A knowledge and understanding of the composition, lifestyles and needs of the population is essential information required in the planning of any models of health-care delivery for this diverse, yet vulnerable population. Whilst the physical circumstances of the situation a homeless person is living in has the potential to impact upon their health, the precise impacts of such diversity of lifestyles and living situations is not, as yet, quantified.

2.4 The oral health of the homeless

2.4.1 Introduction

The oral health of homeless people has been shown to poorer than those of comparable individuals within the general population in the United Kingdom [11, 70, 98], America [4, 96], and numerous other countries such as Sweden and Hong [6, 49, 99, 100].

As previously described, social exclusion has the same effects on oral health as described for general health. Similar mechanisms are also suggested by Wolf *et al* [101] with regard to the effects of exclusion on oral health. Poor health literacy in terms of cognitive (e.g. reasoning, numeracy) and psycho-social (e.g. communication) skills sets together with long-term memory functioning that are necessary for the adoption of oral health preventive messages may unavailable for some homeless people who practice high-risk behaviours and have addiction issues [101]. At a Government level the methods used to provide oral health information using mainstream advertising media such as radio, television, the internet may be inaccessible those residing in temporary accommodation or hostel dwellings [102], but also may prove inappropriate due to poor levels of oral health literacy.

Oral hygiene, and more specifically plaque control is difficult in a homeless setting. Lack of funds often means that a toothbrush and toothpaste are luxuries rather than essentials. Factors contributing to poor oral health for those with a vagrant lifestyle, means that there may be a lack of access to sanitation [11]. Therefore the physical environment in which some homeless people reside may result in daily tooth brushing being physically impossible. In addition, however, tooth brushing may also be low in the list of daily priorities for some homeless people for whom so many other competing needs exist, and who tend towards disorganisation, rather than having established oral health routines [11].

Healthy eating for oral health also presents a challenge for the homeless individual. Planning and preparing meals is virtually impossible, and obtaining healthy ingredients on a low budget is often very difficult. Most meals are 'fast-food' or cheap snacks, which are often high in sugar, rendering them high-risk for dental caries [103].

Freeman [76] suggested that a complex interaction existed regarding access to dental treatment services for people who experience social exclusion. Using Cohen's [77] accessibility factor framework, Freeman [76] suggested that it was the interaction between dental health professional and socially excluded client within a context of poor communication and mutually trusting networks which resulted in barriers to accessing dental care. Homeless people, therefore, while entitled to treatment without financial costs under the auspices of the National Health Service, do not avail themselves of the treatment, nor make appropriate use of dental health-care services [14, 104].

As early as 1998, it was proposed that it was the low ranking of healthcare and dental care in the homeless person's order of priorities, poor levels of perceived need that resulted in high unmet oral treatment needs [14]. This lack of service uptake could be attributed to the range of factors, such as a lack of fixed address for correspondence, fear, or poor health behaviour routines which act as barriers to healthcare and dental care [104]. In recognition of the special needs of this group [105], many Community Medical and Dental Health programmes of care are in existence throughout Scotland [17], which provide additional services for the homeless in order to try to remove barriers to care and reduce inequalities.

A structured review of the empirical evidence of the relationship between oral health and homelessness will be presented. It will examine the literature in detail and critically evaluate it using a systematic approach in order to determine whether any existing literature characterises the oral health of homeless populations in terms of typology in

order to answer the research question, 'Does the empirical evidence show an association between oral health and homelessness?'

2.4.2 Structured review to evaluate the empirical evidence of the association between oral health and homelessness

Homeless people may require additional support to assist them to access dental health care and to promote the adoption of dental health behaviours conducive to oral health. It has been acknowledged that poor health literacy, the adoption of high-risk behaviours and current life experiences [46] may impede the ability of some homeless people to have the capacity for health learning [101] and the adoption of self-care practices. Moreover it been proposed that the combination of the lack of health learning capacity together with poor social and mutually trusting networks may have a detrimental effect on the oral health of homeless populations [11]. Nevertheless the question remains what is the evidence that homeless people have poorer oral health when compared with the general population [106]?

The aim of this structured review was to evaluate critically all published literature reporting on the oral health of adult homeless people using a systematic methodology [107], to answer the research question:

> 'Does the empirical evidence show an association between oral health and homelessness?'

2.4.21 Initial Review of the literature

An initial (or scoping) review of the literature revealed there was a wealth of peer reviewed and grey literature available which explores the relationships between homelessness and general health, in contrast, there were fewer studies which report and focus on the oral health of homeless people. Yet, considering the work of Watt and

Sheiham [108], oral ill-health is an important component of general health which amongst other co-morbidities affect an individual's oral health related quality of life. Oral ill-health can negatively impact upon psychosocial health and well-being [11, 109]. If the oral health of homeless populations is poor, and considering the common risk factor implications [108] then oral health gains could be viewed as a means of improving the health and the quality of life for homeless individuals. The need for a rigorous and systematic review of the peer-reviewed and grey literature, it is suggested would assist an achieving this overall health goal.

2.4.22 Development of the research question

In order to evaluate the literature available in a rigorous manner, a systematic approach to reviewing the literature pertaining to oral health and homelessness was conducted [107]. In this review homelessness will be defined as a dynamic experience which may be of varying forms and typologies throughout an individual's life. The typology of homelessness adopted was the ETHOS typology [8] in order to examine the heterogeneity of homelessness and its relation to oral health status.

If homeless populations are found to have poorer oral health than the general population [3, 11, 110], it can be reasonably assumed that poor oral health is associated with homelessness as a consequence of social exclusion as mentioned earlier. Oral diseases such as dental caries, periodontal disease and soft tissue pathology all affect quality of life and the oral health status of individuals, and hence quality of life [111, 112].

A scoping review of the oral health literature revealed that there was evidence pertaining to the oral health status of homeless individuals; homeless people were shown to have poorer levels of dental health than the general population [11, 110]. However, the scoping review did not provide sufficient information describing the scale of the problem of oral health and homelessness; nor did it inform whether homeless

people throughout the world experience similarly high levels of oral disease, or which types of oral disease are most prevalent in homeless populations, or the effects of the impact of oral disease upon quality of life. Therefore, a structured review, using a systematic approach, was needed to examine the literature reporting on oral health status of homeless populations and synthesise the data obtained. This would provide an evidence-base with regard to the relationship between oral health and homelessness.

A systematic review approach was selected to allow the evidence to be evaluated in a methodical manner in order to determine whether the evidence was consistent with the assumption that, in common with general health, oral health of homeless populations would be poorer than that of comparable, settled populations [11]. Therefore, this review was not designed to evaluate the effectiveness of interventions but instead, the associations between oral disease/ill-health and homelessness were examined. As such, the types of study design likely to be involved in the review were surveys, screening, and cross sectional studies and evaluations.

The research question was carefully framed and developed in order that it rigorously encompassed and identified the target population, outcome and study designs, but also remained simplistic enough so as not to obscure the aim of the review. Therefore, the research question addressed by the systematic review was:

> 'Does the empirical evidence show an association between oral health and homelessness?'

2.4.23 Materials and methods: study design

The review protocol was further developed by scrutinising possible study design components of the review. The key components considered relevant for inclusion in the review are listed in Table 5. Since this structural review did not seek to evaluate the effectiveness of interventions, it focused on surveys, cross-sectional or observational

cohort studies as well as all types of publication, including local publications and unpublished or 'grey' literature be included in the review in order to provide a holistic overview.

Table 5: Key components of proposed review [107]:

Population/Participants	Homeless people (adult populations)
-Study types	Screening of homeless population. Preventive strategies aimed at homeless populations Surveys
-Settings of studies	Homeless shelters/ soup kitchens/ medical facilities/ areas where homeless individuals could be recruited
-Study designs	Cross-sectional studies Observational cohort studies Randomised control studies (RCT)
-Types of outcome	Oral health status recorded

2.4.24 Search strategy

The initial stages of development of the search strategy involved devising a list of search terms which would be germane to the field of literature being sought. Keywords which would elicit articles reporting on homeless populations (homeless/ shelter etc) were combined with keywords which would identify articles concerned with oral health. In order that this would be achievable, the main descriptors of oral health were selected. So, in the first instance, the search terms chosen for use are shown in Table 6.

Following a pilot search using a selection of the terms described in Table 6 the decision was taken to remove the term 'Street' from the list as the results generated by this search term were not limited to conceptualities of homelessness, as had been expected, thus rendering the search results unhelpful. There was, in addition, a need to identify papers which referred to the links between oral health and homelessness within the context of poverty as a modifying factor. This matter was given some consideration, and as homeless people are a socially excluded group, the search term 'social exclusion' was selected as a more useful alternative to the 'street' search term, and was appended in tandem with 'Homeless' or 'Shelter' to maximise relevance of articles retrieved.

Table 6: Initial selection of search terms:

Search Term #1	Search Term #2
'Homeless' / 'Shelter' / 'Street' +	'Oral Health' 'Dental' 'Decay' 'Periodontal' 'Oral Cancer' 'Anxiety' 'Screening'

In order to realise the full potential of the search, MeSH[1] (Medical Subject Headings) terms, the search and retrieval vocabulary entry terms, were utilised. The MeSH system utilises a process of automatic mapping of search terms to descriptors of those search terms which facilitates document retrieval. The MeSH Browser, a free of charge online access point to MeSH was used to generate a MeSH tree structure, as a set of

[1] MeSH is a thesaurus-like set of controlled vocabulary produced by the United States National Library of Medicine which can be used to search Medline/PubMed and other databases.

comprehensive cross-referencing search terms, which was then inputted into the online databases being searched.

Therefore, for the purposes of structured review proper the search terms were as presented in Box 1:

Box1: Search strategy and terms

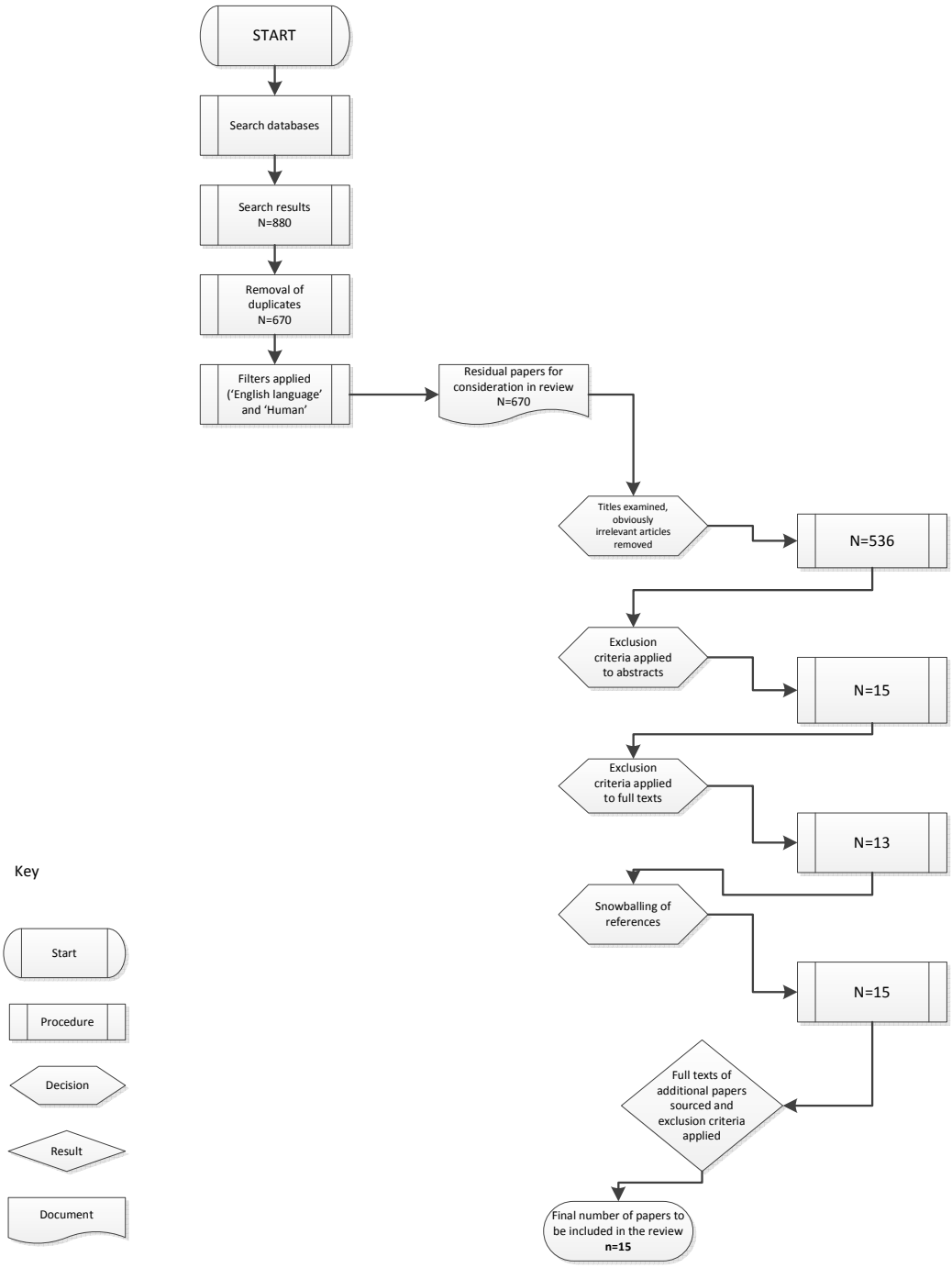
1. (("MM Homeless Persons" or Shelter or Temporary accommodation or hostel) and ("MM Oral Health" or "MH Oral Medicine" or "MH Oral Ulcer" or "MH Pathology, Oral" or "MH Oral Hygiene" or "MH Mouth Diseases" or "MH Lip Diseases" or "MH Periodontal Diseases" or "MH Dental Anxiety" or "MH Anxiety" or "MH Fear" or "MH Dental Caries" or "MH Tooth Diseases" or Dental decay or "MH Periodontal Pocket" or "MH Periodontal Diseases" or "MH Periapical Periodontitis" or "MH Chronic Periodontitis" or "MH Periodontitis" or "MH Alveolar Bone Loss" or "MH Candidiasis, Oral" or "MH Mouth Neoplasms" or "MH Head and Neck Neoplasms" or "MH Facial Neoplasms" or "MH Leukoplakia, Oral" or "MH Salivary Gland Neoplasms" or "MH Oral Ulcer" or "MH Mouth Diseases" or "MH Lip Diseases" or "MH Oral Fistula" or "MH Oral Haemorrhage" or "MH Tongue Diseases" or "MH Stomatitis" or "MH Salivary Gland Diseases" or "MH Periodontal Diseases" or "MH Pathology, Oral" or "MH Jaw Neoplasms" or "MH Lip Neoplasms" or "MH Tongue Neoplasms" or Dental screening or "MH Tooth Loss" or or {Oral Health} or {Anxiety} or {Fear} or {Phobias})).af.

In order to maximise the generation of relevant literature the following databases were searched, for all articles matching the search terms listed above, from database inception to February 2012: Web of Knowledge, Scopus, Pubmed, Zetoc, Medline, University of Dundee library catalogue, Scirus, Jstor, Cochrane library. In an effort to compile a comprehensive selection of relevant papers the databases above were selected in order to identify peer reviewed publications. In addition, an effort to identify 'grey literature' was made. This search, of the ERIC database took the form of a Boolean Search (search term#1 **AND** search term #2) and sought only those papers which had

the search terms contained within the title. For all searches the search limiters were ‘English language’ ‘French language’ and ‘human’.

This search conducted using generated 880 results. Elimination of duplicates and application of the filter criteria requiring consideration reduced this number to 670. A cursory examination of the list revealed that some of the papers, although containing the search terms within their title were unlikely to be relevant. In order to refine the search, methodically excluding irrelevant papers, a selection criteria procedure was followed. A flow chart summarising this process is shown in Figure 5.

Figure 5: Summary of review process



2.4.25 Study selection criteria

The list of papers generated in this search was recorded and examined. A predefined set of exclusion criteria was to be applied to the papers in order to ensure quality control over the papers included in the review (see Appendix 9.2a).

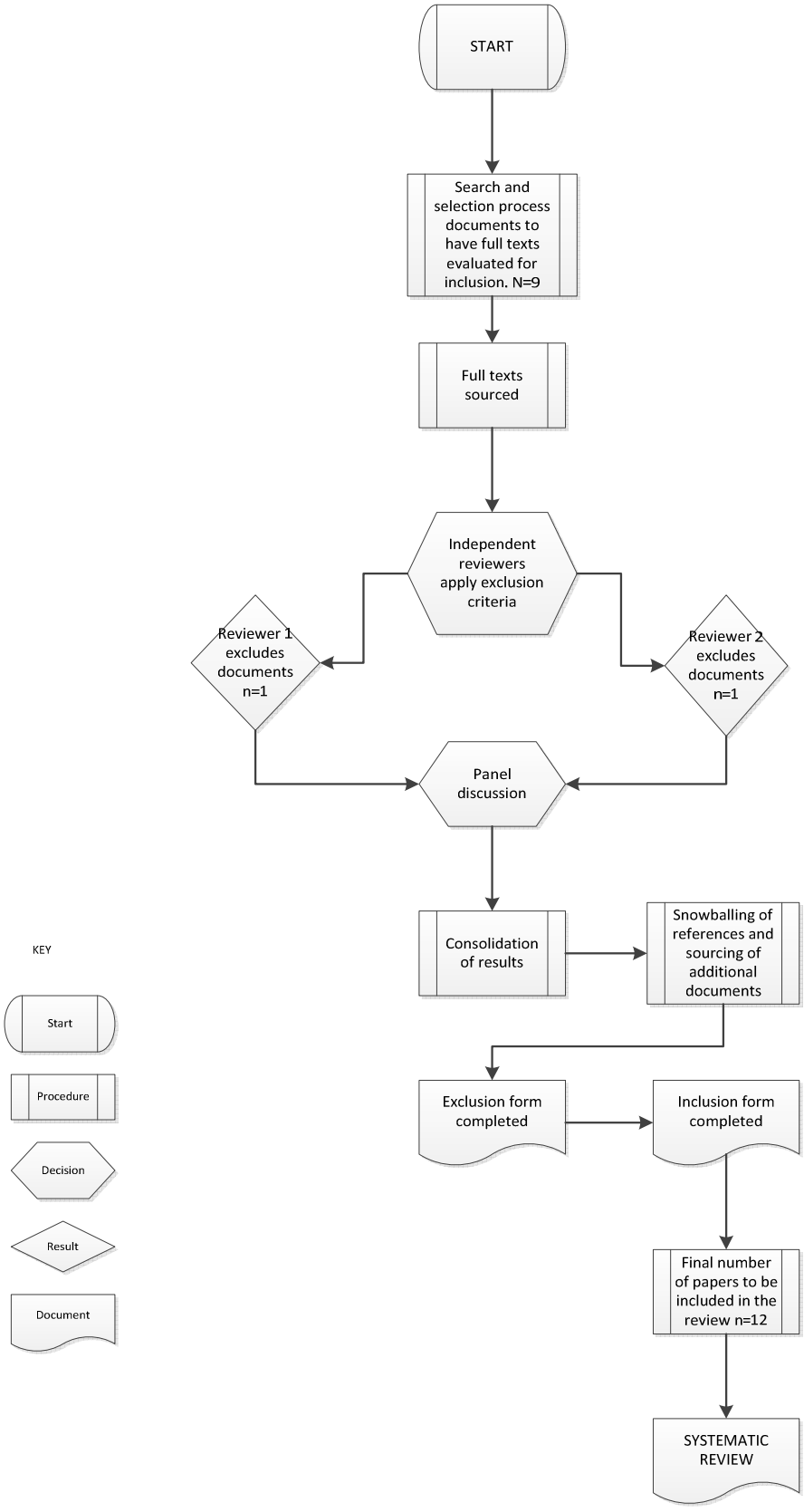
In the first instance, the exclusion criteria were applied to the titles of all the articles retrieved. This allowed some to be removed immediately, leaving 536 papers. Following this, abstracts of all the remaining papers generated by the search were sought. Those papers which were not written in the English or French language were immediately excluded. The remaining 15 abstracts were evaluated using the next part of the exclusion criteria.

In some cases the abstracts did not provide enough information to allow the exclusion criteria to be implemented. The full text versions of all remaining papers were sought and the exclusion criteria reapplied. At this stage a second reviewer (FMA, a qualified dentist with suitable knowledge and experience in this field) appraised the full text documents in isolation from the primary reviewer (JC). There followed a panel discussion where the results were consolidated. Following on from this process 13 papers remained, to be included in the review. So that all potential sources of information were explored, the references cited by those full text papers were hand searched as potential sources of further material.

These papers were evaluated and the exclusion criteria applied including involvement of the second reviewer as outlined above. Figure 6 illustrates the overall review process and role of the second reviewer. Appendix 9.2b describes some of the excluded papers and the logic behind their exclusion. The primary reason for excluding many of the papers was that the study did not include a dental examination. Further studies were excluded from this review as they focussed on child or youth homeless populations [48, 49], whereas this process was focussed on adult homeless

populations. The number of papers which remained following this process of retrieval and exclusion was 15.

Figure 6: Role of the 2nd reviewer



2.4.26 Study quality assessment

The next stage in the review process involved assessment of the quality of the studies involved, as recommended in the guidance provided in the PRISMA Statement which provides advice with reference to carrying out systematic reviews [113], in order that any flawed studies could be identified and, if necessary, eliminated. This was carried out using the STROBE checklist [114]. The STROBE checklist was selected from the range of quality assessment tools available for use in evaluation of research papers. It was selected for application as it is recommended for use by the Cochrane Collaboration in improving the quality of reporting of observational studies and facilitates critical appraisal of such studies in processes such as this structured review [115].

This twenty-two item checklist, was completed for each of the 15 articles which had met the criteria for inclusion in the review. Each of the items in the STROBE checklist pertains to a component of a systematic review. The first item pertains to the title and abstract, items 2-3 relate to the Introduction, items 4-12 pertain to the methods, items 13-17 to the results and 18-22 to the discussion and other information included in the article (see Appendix 9.2c). Each article being appraised was evaluated using the methodical approach of the STROBE checklist. Scrutinising each of the articles in this manner allowed critical appraisal of the articles to be carried out in a systematic manner. Evaluation of bias and flaws and evidence grading was also facilitated.

2.4.27 Data extraction

A data extraction checklist (Table 7) was devised to allow the systematic review of each article in the same manner in order to recording the results of each study. The details recorded included general information, such as title of article, identity of reviewer, and the date that data extraction was conducted. Information salient to the aims of the review was included, such as study characteristics and outcomes of study.

Table 7: Data extraction checklist

Information Required	
Year of Publication	Outcome measures;
Article title	-No. of participants
Reviewer ID	-DMFT
Study eligible?	-Perio
Population	-OHIP
Methodology	-Pain
Quality assessment (limitations acknowledged)	-Oral cancer

2.4.28 Synthesis of data

According to the methodology of a systematic review, the results of the studies meeting the criteria for inclusion in the review may or may not be analysed using statistical techniques (meta-analysis) [113]. In this review a meta-analysis was not selected as a tool for analysis or summarisation of the studies. Instead, a narrative synthesis of the data, where a descriptive account of the data would be given, was chosen, as being the most suitable way to present the results of the review. The reason for this decision being that the data extracted from the studies varied to such a degree that like-for-like comparison was rendered difficult and meta-analysis was not appropriate.

For example, whilst all of the studies used recognised oral health descriptors, there was significant variety in how they would report. Some studies [3-6, 70, 98, 99, 110-112, 116, 117] reported DMFT (obvious decay experience) as a measure of oral health, others used only selected components such as decayed and filled teeth: DFT [95]. Reporting of periodontal status varied considerably [5, 6, 96] and statistical comparison

was impossible. Some of the studies reported that a certain percentage of teeth were found to be affected by periodontal disease [98], others recorded tooth mobility as a measure of periodontal disease [70].

In some of the studies oral mucosal lesions were recorded, indicating pathology [11, 98, 112], others did not record the presence or absence of pathology. Furthermore, the studies reported on differing aspects of the links between oral health and other factors such as age, health behaviours, general health and psychosocial health or oral health-related quality of life.

Given this level of heterogeneity in reporting indicators of oral health and the different styles of recording oral health information, it was decided that a meta-analysis would have limited value and was inappropriate as there was no standardised recording of means across the studies. As there was no consistency in the comparison group, no measure of variation was possible.

2.4.3 Results

2.4.31 Study pool characteristics

The publication dates ranged from 1984 to 2011, with a median publication date of 1997. The studies [3-6, 70, 96, 98, 99, 110-112, 116-118] were located in a variety of major cities throughout the world and focussed on a range of ethnic groups. All of the participants in the studies were homeless (as a requirement for inclusion in the review). The studies [3-6, 70, 96, 98, 99, 110-112, 116-118] used non-probability convenience samples to access homeless populations. The studies [3-6, 70, 96, 98, 99, 110-112, 116-118] were conducted in settings where homeless people tended to congregate to access other healthcare or welfare service providers.

2.4.32 Dental disease: obvious caries experience

As described above the studies all reported decay experience of participants, although not always in the same manner. For example in Boston, Kaste *et al* found that 91.4% of a homeless population had untreated decay [4]. In Hong Kong, Luo and McGrath found that 90% of a homeless population had dental caries, mostly untreated [99].

Gelberg *et al* [96], conducting a survey of oral health in homeless people in Los Angeles, reported similarly high prevalence of dental decay, and higher levels of oral pathology compared with the general population. Surveys conducted in Belfast [11], Birmingham [70] and Leeds [98], all demonstrated an increased dental disease experience. with homeless populations in two of these cities found to have a DMFT (total number of decayed, missing or filled teeth) of 16.6 (Belfast [11]) and 15.9 (Birmingham [70]). This compares unfavourably with the DMFT scores for the general, settled population [119].

2.4.33 Collated review data: dental disease experience and impacts

In the Amsterdam-based study [118] there were 124 participants, the age range was 25-84 years. The mean length of homelessness was 7 years. In this population, 20% of participants reported having experienced toothache within the last three months, 35% reported fear as the main barrier to dental attendance, and 52% reported that their last dental attendance had been greater than 3 years previously. This study observed that there were greater levels of decay in those participants aged younger than 45 years.

The Belfast survey [11] had a sample size of 317 participants. 84% of these were male. There were low levels of self-reported drug abuse (3%). The mean DMFT was 16.2 (95% CI:15.71, 17.46). Two participants were found to have oral cancer. This study reported that dental anxiety status was linked with dental disease experience.

In Birmingham [70], 71 participants were evaluated, with an emphasis on obvious caries experience. In this group 31% were found to be edentulous, and the mean DMFT was 19.7 (SD=8.57). Fifty percent of the sample population had excessively mobile teeth. There were low levels of perceived need, despite the high levels of normative need.

For the Boston based survey [4], which comprised of 73 participants, the aim was to characterise dental caries status in a homeless population. It was found that 66% of participants were male, the mean age was 36 years, and the mean DMFT was 11.10 (SD =6.1). Over 90 percent of these participants had untreated dental caries.

In Brisbane [6] 162 participants were examined. Twenty-nine percent of this all-male sample was edentulous. In terms of periodontal status for the dentate, pocket depth was found to be age dependent ($P<0.01$). The mean DMFT was 21.10 (SD=9.6).

Two of the included studies were carried out in Hong Kong by the same authors and were published in 2006 [99] and 2008 [112]. It was unclear whether the studies which reported on oral health status [99] and impacts of oral health status on quality of life [112] respectively were carried out on exactly the same pool of participants, but in any case the participants were drawn from similar regions of Hong Kong.

In the Luo and McGrath's first survey report [99], 95% of the participants were male, the age range was 21-75 years. Some of the participants had been homeless for up to 40 years. Fifty-two percent of participants reported dental pain within the last twelve months. The mean DMFT was 9.03 (SD=8.68). Those who had been homeless for over one year had higher DMFT scores.

In the second Hong Kong survey [112], which focussed on quality of life as related to oral health, Luo and McGrath [112] reported that 70% of the participants said that they needed to see a dentist, with 46% reporting that their last dental visit was over 3 years

previously. Of the participants 27% said that if they had dental pain, and they would manage the pain themselves rather than visit a dentist. Greater than one oral health impact was reported by 88% of those surveyed, with 49% described as having psychological disability. In this sample oral health impacts were found to be linked with toothbrush ownership ($P<0.01$). Furthermore, oral health burden was linked with dental pain ($P<0.01$), and higher DMFT scores were associated with increased oral health burden on quality of life ($P<0.05$).

In the Leeds based survey [98], Blackmore *et al* examined 104 participants, all of whom were male. The mean DMFT here was 20.80, 80% of participants had teeth affected by periodontal disease, and 15 participants were found to have oral mucosal lesions. 100% of this sample required dental treatment.

Daly and colleagues in London [111] reported on 102 participants who were examined, 92% of whom were male. The mean DMFT was 15.50 (SD=7.6), the mean number of oral health impacts [120] was 5.9 (SD=4.8). Sixty five percent of participants had reported pain, and 44% reporting that they felt handicapped by their oral condition.

In the Los Angeles [96] survey there was a large sample of 529 participants. There was a mean of 2.3 grossly decayed teeth. The authors reported an inverse link between levels of dental pathology and use of dental services. Tooth decay and levels of missing teeth had a positive association with age, physical ill-health, smoking and alcohol consumption.

A smaller study in Newark [116] involved 46 participants. The mean DMFT was found to be 16.20. Eighty seven percent of these participants reported negative oral health impacts, and 55% had current oro-facial pain.

In the Stockholm survey [5] there were 147 participants with an age range of 22-77 years. The median DMFT was 27.0. Oral mucosal lesions were found to be common, as were high drug abuse levels. Eighty six percent of these participants reported pain and 67% reported that they did not own a toothbrush.

Reporting on the homeless population in the Toronto study [110] De Figueiredo sampled 191 participants. The participants' ages ranged from 18-75 years. The mean DMFT was 14.42 (SD=8.1). The majority of the participants required some form of periodontal treatment intervention (71%). Thirty-three percent of the participants had reported that they had suffered from dental pain within the last month. Fifty percent of the participants reported recent health problems which required a stay in hospital at least once within the last year. Forty percent of the sample used drugs. Forty-five percent reported that they were dissatisfied with the appearance of their teeth. There were mucosal abnormalities present in 6.3% of the sample and 40% of the participants were deemed to be in urgent need of dental care.

Gibson *et al* [3] focussing on homeless veterans across the United States of America sampled 1,154 participants, however, not all of the participants received a dental examination. Only 150 participants received a dental examination. All of these participants were homeless male military veterans. Their ages ranged from 24 to 79 years. The mean DMFT was 15.21 (95%CI:14.28,16.44). A high percentage of the participants exhibited signs of periodontal disease (87%). Forty-five percent of the participants had suffered from recent dental pain, and 9.6% of the participants were noted to have head and neck pathology. Twenty-six percent of the sample rated their oral health as being 'poor' (the other options available in the self-rating questionnaire being 'excellent', 'good' and 'fair'). This survey compared and contrasted the oral health of the homeless veterans to the general population and concluded that the oral health of the homeless population was poorer that the general population, with the

homeless participants showing higher levels of head and neck pathology, and higher levels of decayed or missing teeth.

Coles *et al* [117] reported on a Scotland-wide population of homeless people. This survey had a sample size of 853 participants, 74% of whom were male. The mean DMFT was found to be 15.87 (95% CI: 15.17-16.58), with 12% of the participants having reported that they often experienced toothache. The mean number of oral health impacts were 1.19 (95%CI: 1.11-1.27).

Homeless people have been shown to have poorer levels of dental health, than the general population [119, 121] with homeless experiencing high levels of dental caries and periodontal disease [11, 96]. The dental disease experience of homeless populations has been consistently demonstrated to be higher than those of the settled populations (Table 9).

2.4.34 Quality of the evidence

The quality of the studies was assessed using the Strobe statement checklist [114] as detailed above. The data obtained using this checklist system is summarised (Table 8). The quality of the articles included in the review was, given the difficulties accessing and randomly sampling homeless populations, generally of a high standard according to the STROBE assessment criteria as shown in Table 8.

All of the studies included in the review stated their aims and objectives and provided an explanation regarding how the experimental design achieved their stated aims. and acknowledgment was made of the limitations of the research, in particular the difficulties with access to and follow-up of homeless populations was acknowledged by Luo and McGrath [99] and Daly *et al* [111] A summary of the collated data review is presented in Table 9.

Table 8: Summary of STROBE checklist data

Article and Authors	Year and Location	Quality assessments				
		Participant eligibility criteria described	Study size methodology described	Potential sources of bias acknowledged	Limitations acknowledged	Statistical methods described
Jago & Strenberg [6]	1984 Brisbane	YES	NO	NO	NO	NO
Gelberg & Linn [96]	1988 Los Angeles	YES	YES	YES	YES	YES
Kaste & Bolden [4]	1995 Boston	YES	YES	YES	YES	YES
Blackmore & Williams [98]	1995 Leeds	YES	YES	YES	YES	YES
Waplington *et al* [70]	2000 Birmingham	YES	YES	NO	NO	NO
Gibson, G *et al* [3]	2003 USA	YES	YES	YES	YES	YES
DePalma *et al* [5]	2005 Stockholm	YES	YES	YES	YES	YES
Conte *et al* [116]	2006 Newark	YES	NO	YES	YES	NO
Luo & McGrath [99]	2006 Hong Kong	YES	YES	YES	YES	YES
Collins & Freeman [11]	2007 Belfast	YES	YES	YES	YES	YES
Luo & McGrath[112]	2008 Hong Kong	YES	YES	YES	YES	YES
Daly *et al* [111]	2010 London	YES	YES	YES	YES	YES
Van Laere *et al* [118]	2010 Amsterdam	YES	NO	YES	YES	NO
De Figueiredo [110]	2011 Toronto	YES	YES	YES	YES	YES
Coles *et al* [117]	2011 Scotland	YES	YES	YES	YES	YES

Table 9: Summary of review

Article and Authors	Year and country	No. of Participants Gender Age	mean DMFT	Periodontal Status	OHRQoL	Pain	Oral Mucosal Lesions
Jago& Sternberg [6]	1984 Brisbane, Australia	n=162 Male=100% Age:15-85	21.1	90% needed periodontal treatment	Not recorded	Not recorded	9.9% of population
Gelberg & Linn [96]	1988 Los Angeles, USA	n=529 Male=78% Age:18-78	mean D=2.3	Not recorded	Not recorded	27%	Not recorded
Kaste & Bolden [4]	1995 Boston, USA	n=73 Male=66% Age:19-64	11.1	Not recorded	Not recorded	Not recorded	Not recorded
Blackmore & Williams [98]	1995 Leeds, England	N=104 Male=100% Age:18-75	20.8	80% periodontal disease	Not recorded	15%	8% of population
Waplington *et al* [70]	2000 Birmingham, England	n=77 Male=56% Age:19-94	19.7	50% with mobile teeth	Not recorded	Not recorded	Not recorded
Gibson, G *et al* [3]	2003 United States of America	n=150 Male=100% Age;24-79	15.21 (CI: 14.28, 16.44)	87% with periodontal disease involving bone loss.	Not recorded as OHIP, but 26% self-rate oral health as poor	45% reporting recent pain	9.6% with head and neck pathology
DePalma *et al* [5]	2005 Stockholm, Sweden	n=147 Male=75% Age:22-77	27.0	96% with periodontal pockets	88% report being embarrassed by their teeth	86.35	Not recorded

Article and Authors	Year and country	No. of Participants Gender Age	mean DMFT	Periodontal Status	OHRQoL	Pain	Oral Mucosal Lesions
Conte *et al* [116]	2006 Newark, USA	n=46 Male=49% Age (mean)=40.4	16.2	97.8% required periodontal treatment	87%reported more than one impact	55.6%	Not reported
Luo & McGrath [99]	2006 Hong Kong	N=140 Male=95% Age:21-75	9.0	96% with periodontal pockets	Not recorded	52%	Not recorded
Collins & Freeman [11]	2007 Belfast Northern Ireland	N=307 Male=84% Age:16-94	16.16	75% with bleeding gums; mean	14.8 mean number of OHIP impacts	Not recorded	6% oral cancer
Luo & McGrath [112]	2008 Hong Kong	147 Male=95% Age:21-75	8.07	96% with periodontal disease	88 % reporting impacts	51%	12%
Daly *et al* [111]	2010 London England	102 Male=92% Age:19-77	15.5	80% required periodontal treatment; mean CPI=1,9	5.9 mean number. of impacts	65%	Not recorded
Van Laere *et al* [118]	2010 Amsterdam The Netherlands	124 Male=82% Age:25-84	Not recorded	44% with 'unhealthy periodontal' status	Not recorded	29%	Not recorded
De Figueiredo [110]	2011 Toronto Canada	191 Male=61% Age:18-75	14.42 (SD=8.1)	71% require periodontal treatment	Not recorded	33% in last year	6.3%
Coles *et al* [117]	2011 Scotland	853 Male=74% Age:16-67	15.87 (95%CI: 15.17-16.58)	Not stated	Mean OHIP=1.19. (95%CI:1.11-1.27) 26% often self conscious	12% often have toothache	Not Stated

2.4.35 Discussion

The included articles, when critically appraised were found to be of a consistently high standard as assessed using the STROBE standards [114]. The strength of the evidence in each of the included studies was also robust. In each of the studies reported the authors have made efforts to acknowledge potential limitations and sources of bias. The study sample sizes were large, lending statistical credence to the results.

The included studies drew their participants from convenience samples from localities where homeless people were known to congregate. Although a randomised control sampling methodology, which would be most desirable in terms of study design, this was not realistic for the recruitment of participants who experience social exclusion. Authors of the various articles acknowledged this constraint as a potential limitation [3-5, 11, 98, 112, 116, 117] and in some cases attempts were made to overcome the difficulties in accessing participants for example by employing stratified cluster sampling techniques [110].

Each of the studies included in this structured review focussed on the oral health of homeless people. In each case it was reported that the oral health of the individuals examined was poor. In addition, the impact of oral ill-health experience was found to be high.

Dental decay was with associated homelessness [3-6, 70, 96, 98, 99, 110-112, 116-118]. The higher than average level of dental caries experienced by homeless people is in addition related to a diet high in sugars, oral hygiene behaviours (lack of fluoride toothpaste use), and health behaviours detrimental to dental health [96]. Homeless people also experienced high levels of periodontal disease [111, 112], and had an increased risk of developing oral cancer [11].

The homeless populations from which the various study participants were drawn consisted not only of different nationalities, but also a range of ethnic groups. It is revealing that the high prevalence of oral diseases experienced by those described as homeless is not limited to one particular region, but is a worldwide trend. Therefore this structured review reveals the generalisability of the findings that the oral health of people experiencing homelessness is poor.

As with all structured reviews there are limitations. The main limitation is the potential for incomplete retrieval of relevant literature. In order to avoid this, every effort was made in the design and implementation of this review to ensure that all relevant articles would be identified and included, thus reducing the risk of inadvertently omitting relevant articles. Another potential limitation in a review process is the risk of bias, due to either the reporting author or the reviewer, which can impact upon the findings of the review. In this process the risk of reporting bias was reduced by the deployment of a second reviewer who, during the article inclusion/exclusion process provided an independent opinion. However, despite these potential limitations, this structured review has answered the research question and has demonstrated an association between oral health and homelessness. The impacts of dental disease are serious and have the potential to be life threatening, as in the case of infection resulting from untreated dental abscess or oral cancer. Experience of dental disease can lead to pain, swelling, interrupted sleep, reduced ability to eat and other deleterious effects. The literature supports the assertion that poor oral health is associated with being homeless. Moreover the high oral disease prevalence is demonstrated to impact negatively upon homeless people's quality of life.

Therefore as homeless populations throughout the world experience poor oral health, it may be suggested that the association between oral health and homelessness is a generalisable finding. The finding that poor oral health is associated with homelessness in different countries and societies raises the proposition that oral health

may be used as an additional descriptor in such recognised typologies of homelessness, as ETHOS [8].

2.5 Conclusions to the literature review

People who experience homelessness are now recognised as a diverse and heterogeneous group. People who experience homelessness include lone children, single parent families, women residing in refuges, immigrants, two parent families – in fact anyone ranging from the very young to older people. It is of little surprise that the disease prevalence experienced by homeless people has been attributed to factors related to the 'traditional' homeless lifestyle, which has been characterised as chaotic, itinerant and impoverished. Despite the acknowledgement of the various typologies and descriptors of homelessness, it has been proposed that it may be the stress associated with insecure housing, difficulties in functioning within society which give rise to the potential for ill-health and that potency of these factors increase with the duration of homelessness experienced.

Health inequalities can therefore be defined as differences in health experiences and health outcomes between different population groups of those who experience homelessness. The effects of these health inequalities are to be seen throughout society, where substantial improvements in general and dental health over recent years are unevenly distributed, with the less well off being left behind [122]. It is becoming more and more evident that opportunities for good health are linked with the opportunities afforded by improved socio-economics, and conversely socio-economic disadvantage has a contribution to poorer health [123].

There are a number of interlinked contributory factors at work in this context. In the first instance experience of such extreme material and emotional poverty as encountered by those experiencing homelessness, is linked with experience of disease, through increased exposure to risk factors for certain diseases – with poverty acting as

the driving force behind the development of high-risk health behaviours which act to increase the risk of diseases. This is true for many diseases such as, for example, cardiac disease, where the stress associated with extreme poverty can act as a risk factor, and health behaviours such as poor dietary habits elevate the risk of disease development [23].

This argument is applicable in the context of oral health where some of the worst levels of dental decay are observed in those most affected by material poverty. Again this theme follows through in the context of homelessness, where the homeless are seen to experience higher levels of oral disease than the general, settled population [11, 106]. These links between poverty and ill-health are increasingly conspicuous in modern society, and as a result, the causal factors are being examined more closely [122].

There is a heightened recognition of the importance of environment, behaviour, and other factors such as gender, ethnicity and sexuality within the context of health experience. For the homeless population, the impacts of environmental factors are vital. They are also the most problematic to alter or control. Homelessness is likely to result in increased exposure to the elements, such as cold, damp. Less obvious is the increased exposure to environmental pollutants and noise, or the impact of shared unsuitable or unfit housing, which can be overcrowded, have poor sanitation issues. The homeless may also have difficulty in accessing the very basic provisions like clean water and food. Every one of these elements can have a clear effect on health, and can be seen to have immediate impacts on risk of disease experience [124].

Health behaviours are as important in the context of homelessness. As previously described, for some, the general struggle for daily existence is likely to impact on their health behaviours. Even if concerned, they may be unable to alter some of their circumstances. The lack of access to hygiene facilities and the difficulty in carrying possessions can act as an impediment to routine oral care [4]. Access to food may be

sporadic and opportunistic. For example, there are benefits to be had in eating healthy foods, such as fruit and vegetables [125]. The importance of a balanced diet has been well advertised. Unfortunately, healthy food costs more than fast food or junk food, and is less easily obtained in convenience stores. A balanced meal can be difficult to source and prepare if someone is sleeping rough and has no access to cooking facilities.

As environment and behaviours which the homeless may share with some of the least advantaged of the settled population, are important in the framework of health inequalities, other factors are unique to the homeless experience. The stigma attached to homelessness [9], and in particular, rough sleeping, can trigger behaviour in others in the community similar to racism. This leads to ill treatment of the homeless in the form of violence, abuse and prejudice, which can be very traumatic for the victims [126]. In some cases this can affect their dental treatment where the perception that treating such people can be hopeless has been acknowledged as a barrier to care [6].

Homeless people can easily withdraw from society, either on their path towards homelessness, e.g. becoming distanced from family and friends due to lifestyle choices, by choice as a reaction to ill treatment by others as described above, or by lack of opportunity to interact with others. This withdrawal or marginalisation can lead to socio-economic disadvantage through social exclusion [28]. An individual is considered as being affected by social exclusion if they have low levels of social capital i.e. if they have few social support structures to draw upon [127].

If homeless people have lost contact with friends and family, they will engage little with the community, or have little if any interaction with others within society. Homeless people are very likely to be affected by social exclusion, albeit to varying degrees. They do not have a fixed address, and by definition cannot have neighbours. Friends and family relationships are difficult to maintain, as they have no address or telephone

facilities, or direct access to social networking sites on the Internet. All the impetus for maintaining relationships must come from the homeless person, in that they must initiate contact. Given that chaos is often a feature of the homeless lifestyle, particularly if affected by addiction [97], this can be difficult.

Engagement with the community is often unrewarding for the homeless person, with negative experiences, violence or discrimination likely to provoke a reaction of further withdrawal. The homeless can undoubtedly become detached from the structures of society, and can pay the price of this social exclusion in their experience of ill health and their ability to cope with disease, in terms of recovery, as affected by their inability to access the familial, and otherwise, support structures which form the fabric of society. Attendance at routine dental care appointments, for example, is affected with low attendance rates reported [6, 96, 118]. Even when appointments are facilitated, attendance is poor [98].

This disadvantaged group of people can experience a compounding disadvantage if the negative effects of their social position are combined with difficulties in access to healthcare, propagated by poor service design. There is a need for substantive evidence which can be used as a platform for care providers and policy makers when planning services which are designed to overcome barriers to homeless healthcare [116].

Oral healthcare delivery systems have been shown to be ineffective as demonstrated by the high levels of unmet need within homeless populations throughout the U.K. [11, 70, 98], and elsewhere [4, 6, 96, 99, 116]. Oral health is an important component of general health [128], and has significant impacts on quality of life and self worth [116, 129]. Furthermore, the causes and effects of oral disease are linked with general health and there are potential benefits to approaching oral disease prevention and treatment within the context of a holistic, common risk factor approach [108]. This study seeks to evaluate homeless populations throughout Scotland, with a view to examining their

oral health, psychological and social well-being and the reciprocal relations between these factors with a view to developing improved oral health delivery systems throughout Scotland. Homeless dental care services are, therefore, often designed to minimise the effects of the barriers to care and take into account the effects of social exclusion and socio-economic disadvantage.

Although all of the articles included in this review examined homeless populations within specific hostels or 'other homeless' contexts, none expressly evaluated the health, oral health or psycho-social health of the participants within a framework of context specific location or lifestyle choices. Given the recognised potential impacts of environmental factors and health behaviours which are in turn influenced by the type of homelessness experienced by individual homeless people, a typology with additional oral health, health and psychosocial wellbeing descriptors would be beneficial to tailor health interventions for the heterogeneous groups of people who have been described, in the past, as 'the homeless'.

The various typologies of homelessness while they describe homelessness in terms of housing, duration of homelessness or factors associated with disaffection of society, none have incorporated additional oral health, health and/or psychosocial wellbeing as descriptors of the various typologies of homelessness. This is an important omission, if those experiencing homelessness are to engage with health and oral health services. In order to achieve engagement the need for tailoring to the needs of the homeless individual in terms of typology and associated oral health, health and psychosocial wellbeing is essential. Therefore there is a need to investigate whether oral health, health and/or psychosocial wellbeing can be used as additional descriptors of homelessness typology.

3.0 Purpose of the survey: aims and objectives

3.1 Introduction

3.2 Research question

3.3 Aim

3.4 Objectives

3.1 Introduction

The narrative literature review examined the various concepts of homelessness and highlighted the heterogeneous nature of homeless populations, through an examination of the prevalence and incidence of homelessness, and the definitions and typologies which are used to characterise homelessness. These typologies were based on the perceived type of homelessness ranging from absolute homelessness to statutory homelessness [8]; the ETHOS typology which encompasses an accommodation-related definition of homelessness [17] to those which provide a most basic definition with homelessness as being 'without a home'. [130] In addition the narrative review demonstrated that those experiencing homelessness also experienced increased physical ill-health and emotional ill-health (psycho-social impacts).

Within the literature there appeared to be little which related oral health to the homelessness experience in terms of the typologies of homelessness [11, 111-113, 117]. In order to address this issue a second structured review was conducted. This structured review examined the research question; 'Does the empirical evidence show an association between oral health and homelessness? The review showed an association between oral health and homelessness. Moreover, since this finding could be generalised for homeless populations in various countries it seemed reasonable to suggest that oral health could act as an additional descriptor within a recognised typology of homelessness such as the ETHOS typology. Therefore, there is a need first, to examine the prevalence of oral health, health and/or psychosocial wellbeing within a homeless population and secondly, to investigate whether oral health, health and/or psychosocial wellbeing factors can discriminate between those who may descriptively be described as roofless, houseless and other forms of homelessness (insecure and inadequate housing) [8] and act as additional descriptors for the ETHOS typology of homelessness.

3.2 Research question

Therefore the research question which arose from the literature was:

'Can oral health, health and psycho-social wellbeing be used as additional descriptors of a recognised typology of homelessness for a Scotland-wide homeless population to inform the development of a tailored service provision to increase engagement with health services?' To operationalise this research question the decision was made to use the ETHOS typology of homelessness which was internationally recognised and considered to be a valid and reliable construct of homelessness. Therefore the ETHOS typology was adopted to categorise homelessness as (1) 'Roofless', (2) 'Houseless' and (3) 'Other homeless' (insecure and inadequate housing).

3.3 Aim

The aim was to investigate if oral health, health and psycho-social wellbeing can be used as additional descriptors of the ETHOS typology of homelessness for a Scotland-wide homeless population to inform the development of a tailored service provision to increase engagement with health services.

3.4 Objectives

1. To describe the demographic profile of a Scotland-wide population of homeless people
2. To examine the general health needs and health-related behaviours of a Scotland-wide population of homeless people.
3. To examine the oral health needs, including oral health-related attitudes, behaviours and dental treatment experiences of a Scotland-wide population of homeless people.
4. To assess the psycho-social health including dental anxiety, oral health related quality of life and depression of a Scotland-wide population of homeless people
5. To investigate whether oral health, health and/or psychosocial wellbeing factors can discriminate between those who may be described as roofless, 'houseless or

experiencing other forms of homelessness (insecure and inadequate housing) in a Scotland -wide population of homeless people.

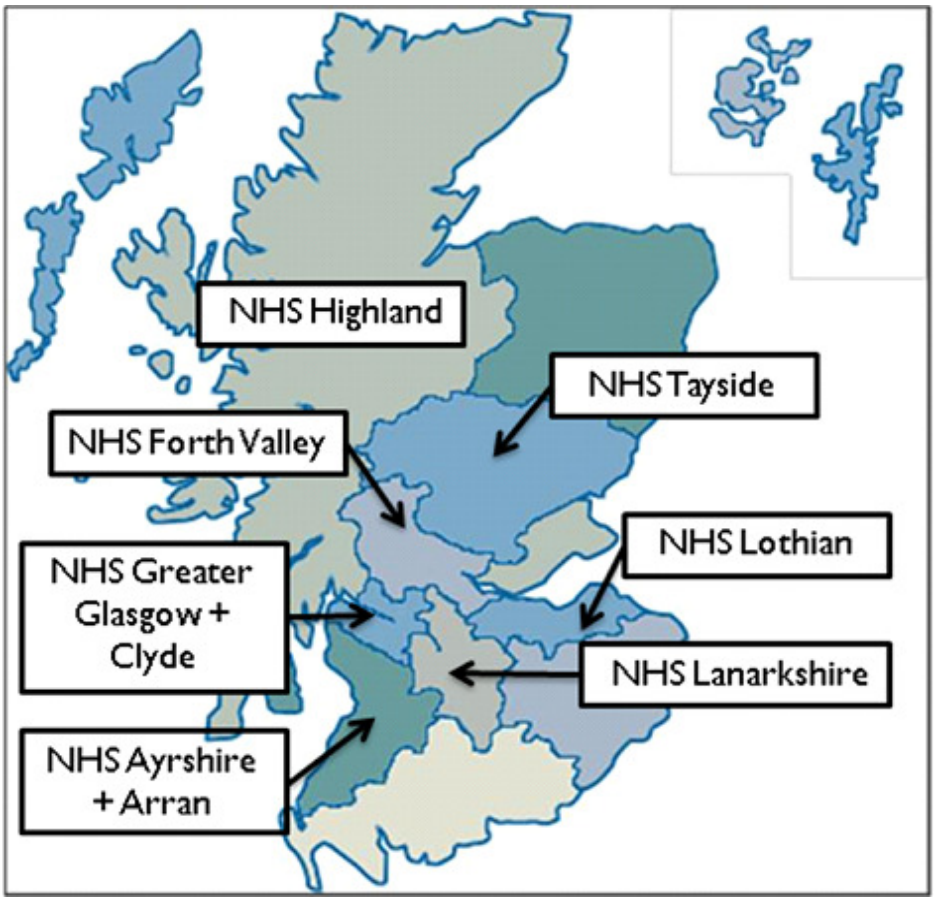
6. To examine whether oral health, health and/or psycho-social wellbeing factors are additional descriptors for the ETHOS typology of homelessness in a Scotland-wide population of homeless people, and may inform health service provision.

4.0 Method

4.1 Sample

Homeless people residing in seven Scottish NHS Boards: NHS Ayrshire and Arran, NHS Forth Valley, NHS Greater Glasgow and Clyde, NHS Highland, NHS Lanarkshire, NHS Lothian and NHS Tayside were sampled (Figure 7).

Figure 7: NHS Boards which participated



It was not possible to generate a random sample of homeless people due to the lifestyle of these populations. Instead, in common with other major studies involving homeless populations [92, 111, 112], a convenience sample was gathered, with anyone consenting to take part included in the sample. All mainland NHS Boards in Scotland were invited to participate, two NHS Boards declined to be involved, and two NHS Boards could not participate due to other commitments and logistical restraints.

Throughout the data collection period, homeless people were invited by the dental team examiners to participate, and those consenting were invited to take part. Various venues across the seven NHS Boards were visited, with the aim of recruiting participants, on several occasions and at different times, with a snowball effect generated, maximising the number of people participating in the survey. Table 10 shows the venues and procedures used to gather the sample of homeless people. The venues included drop-in centres, shelters, soup kitchens, women's refuges and night shelters. In order to gather the sample these venues were visited during the day and, in some instances, at night.

4.2 Ethical considerations

The National Research Ethics Service was contacted concerning the requirement for ethical approval. The Integrated Research Application System (IRAS) responded to state that ethical approval from an NRES was not required (see Appendix 9.3). This information was provided to each of the NHS Boards and they were asked to liaise with their relevant local NHS R+D organisations.

Ethical approval was obtained from the University of Dundee Research Ethics Committee (UREC 9005). Information sheets detailing each aspect of the survey together with written consent forms were provided to each participant. Informed consent was sought from each of the participants prior to taking part in the needs assessment (Appendix 9.4).

Table 10 Details of data collection by participating NHS Board

	NHS Ayrshire & Arran	NHS Forth Valley	NHS Greater Glasgow & Clyde	NHS Highland	NHS Lanarkshire	NHS Lothian	NHS Tayside
Days/ Times	Daytime only	Daytime only	Daytime and occasional evenings	Daytime only	Wednesdays 6-9pm	Daytime and occasional evenings	Daytime only
Frequency	1 session a week	1 session per week	1 session per week	1 session per week	Once a week (visits to 2 establishments per night in one area)	2 sessions per week	1 session per week
Staff	1 dentist, 1 dental nurse, public health nurse administering questionnaire. Member of OHP Team to do opportunistic advice	1 dentist and 1 dental nurse	1 dentist and 1 dental nurse	1 dentist, 1 dental nurse and an oral health coordinator	Team of 3: dentist, dental nurse and administrator. Survey team consists of 4 dentists, 4 dental nurses and 1 senior HPO, working on a rota	2 dentists and 2 dental nurses	1 dentist, 1 dental nurse, 1 hygienist and/or public health nurse from homelessness health team
Venues	Mainly hostels (may take place in drop-in centre occasionally)	Hostels and the Salvation Army Drop-in Centre	Partick Dental Clinic for Homeless People, Hunter Street Homeless Health Centre, indoor soup kitchen	Hostels, residential units, day centre, women's refuge, homeless van, plus the homeless service	Hostels and soup kitchens	Cowgate Clinic, day centres, hostels, night shelter	Hostels, day rooms

4.3 The questionnaire

The questionnaire administered to participants consisted of six parts (Appendix 9.5) and assessed demography, general health and related behaviours, psychosocial wellbeing and oral health and oral health-related attitudes and behaviours.

Section 1: Demographic profile:

Section 1 assessed the participant's demographic profile. These questions asked about the participants' age, gender, marital status, living status, previous employment status and reasons for homelessness.

Section 2: Health and health-related behaviours

This section assessed the participants' health. It required the participants to provide relevant details regarding their medical history. These questions included asking about heart disease, hypertension, epilepsy etc. The participants were also asked about prescribed medication and current use of medical services. With regard to their health behaviours the sample population were asked about their use of tobacco, smoking habits, alcohol and drug use.

Section 3 Psycho-social well-being

Three aspects of psychosocial wellbeing were assessed. These were dental anxiety, oral health related quality of life and depression.

- Dental anxiety: Dental anxiety was measured using the Modified Dental Anxiety Scale (Humphris *et al* [132]). This is a 5 item inventory which assesses dental anxiety on a 5-point scale ranging from not anxious (5) to extremely anxious (25). The participants are asked to rate the level of dental anxiety, when waiting for dental treatment, waiting for the drill, scale and polish and when receiving a local anaesthetic injection. Scores over 19 are said to be indicated dental phobia, with 12% of UK adults belong classified as having extreme dental anxiety. Scores of

10.50 are considered the normative value for a general practice patient population [133]. The validity and reliability of this measure has been tested [132].

- Oral health-related quality of life: The Oral Health Impact Profile (OHIP-14) is a validated, reliable 14-item inventory was used to assess oral health-related quality of life [120]. It is based on a hierarchy of impacts arising from oral disease, ranging in severity, and includes questions on functional limitation (e.g. pronouncing words), physical pain (e.g. painful aching mouth), psychological discomfort (e.g. feeling self-conscious), physical disability (e.g. interrupted meals), psychological disability (e.g. feeling embarrassed), social disability (e.g. irritable with others) and handicap (e.g. life less satisfying). Respondents are asked how frequently they had experienced each of the 14 impacts, such as 'painful aching in your mouth' in the previous 12 months. Responses are made on a five-point Likert scale, with scores ranging from 0 (never) to 4 (very often). Individual item scores are presented individually as well as overall mean total impact scores across all 14 items.

- Depression status: the Centre for Epidemiological Studies Depression Scale (CES-D) [134]. Depression was measured using the valid and reliable CES-D. The CES-D is a self-reported scale consisting of twenty items reflecting dimensions of depression, such as depressed mood, feelings of hopelessness and interactions with others. This questionnaire has been demonstrated to have high internal consistency (0.91) [134]. The questions are answered on a four-point Likert scale and the respondents are asked to rate their experience of each item in the previous week, the responses ranged from rarely or none of the time (scoring 0) to most or all of the time (scoring 3). Four of the twenty items (e.g. I feel happy) are scored positively i.e. the responses ranged from 3 (rarely or none of the time) to 0 (most or all of the time). Total scores range from 0 to 60, with scores of 16 or over indicating depressed mood. In a survey of people residing in north London the prevalence of depression as assessed by the CES-D was 38.9%. [134]

Section 4 Oral health related attitudes and behaviours

The final part of the questionnaire recorded the reason for last attending the dentist (e.g. check-up or trouble with teeth) and previous dental treatment experiences (e.g. fillings and extractions).

Opinions about going to the dentist were also assessed in this section, using measures from the Adult Dental Health Survey 1998 [135] where nine statements related to going to the dentist are made. The statements related to attending the dentist with toothache, waiting to see the dentist, whether drop-in facilities were desirable, behaviour of the dental receptionist, feelings about the type of treatment desirable and the accessibility of treatment. Participants are asked to rate their responses on a four-point Likert scale, ranging from the least weighted item 'definitely feel like that' (scoring 0) to the most weighted item 'don't feel like that' (scoring 4).

4.4 Oral health examination

An oral health survey collection form, completed by the examiners, recorded information regarding the incidence of oral mucosal lesions, and the participants' obvious decay experience. In addition the amount of plaque present, the number of standing teeth and the presence or absence of dentures was also collected. The Basic Inspection protocol from the National Dental Inspection Programme was used for the clinical examination. The NDIP criteria for obvious decay experience involves 'visual-only detection of missing teeth, filled teeth and teeth with obvious dentinal decay' ($D_{3cv}MFT$) [106]. The presence and absence of plaque was assessed, using the Simplified Oral Hygiene Index (OHI-S). Oral mucosal integrity was evaluated by noting the presence of any mucosal lesion. The protocol described above, was chosen as the criteria were reliable, tested and robust epidemiological measures.

In order to ensure inter-examiner reliability, prior to the survey commencement, the dentists (dental examiners) and dental health professionals (scribes) who were to be involved in the clinical data collection were provided with training targeted towards dental health of homeless people. This training was specifically tailored towards improving understanding of the procedures and the clinical data collection (including oral mucosal lesion, obvious decay experience and plaque score analysis). The training day was designed to standardise dental examiners and ensure fidelity of questionnaire administration [106].

Calibration of the dental examiners was not carried out as the dentists acting as examiners were drawn from the Salaried Dental Services and had recent and previous experience of calibration for the Scottish National Dental Inspection Programme (NDIP). As mentioned above the criteria, used in the Basic Inspection protocol of NDIP were used in this survey of homeless people. In order to facilitate standardisation of dental examiners Professor Gail Douglas, University of Leeds, and Mr Chris Cunningham provided a workshop on the identification of obvious decay experience using the NDIP criteria and Dr Anita Nolan, Consultant in Oral Medicine, NHS Tayside provided an overview of oral mucosal lesions including squamous cell carcinoma.

A number of talks were provided to ensure that all those participating in the data collection knew about the various psychological inventories (e.g. the Oral Health Impact Profile (OHIP 14) within the questionnaire. These talks were provided by: Professor Ruth Freeman, Emma Coles from Dental Health Services Research Unit, Dundee and Rhona Brown from NHS Highland. In a question and answer session, conducted by Professor Ruth Freeman, ensured that those dental health professionals administering the questionnaire did so using standardised procedure (e.g. not assisting to answer any question for the homeless person participating); that care pathways were put in place if a respondent became very distressed during the administration of the questionnaire and required referral to mental health services.

JC was directly involved in the design of the questionnaire, protocol development, and NHS ethical approval application for this survey. JC also organised and participated in the training day and ensured that the data collection proceeded smoothly

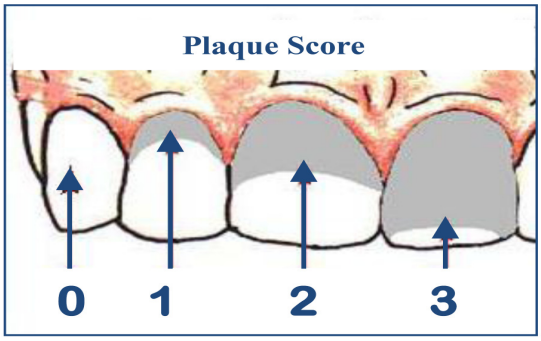
i. Obvious Decay Experience Assessment

Obvious decay experience ($D_{3cv}MFT$) was assessed using the criteria and guidelines in accordance with the Basic Inspection from the National Dental Inspection Programme. The dental status was recorded as obvious decay experience ($D_{3cv}MFT$) which recognised visual dentine caries (D_{3cv}) or 'decay that can be seen to go into the dentine' [106]. Obvious decay experience was defined as the total $D_{3cv}MFT$.

ii. Periodontal Health Assessment : Simplified Oral Hygiene Index

Plaque scores were assessed on six anterior teeth. A score per index tooth was allocated according to the Simplified Oral Hygiene Index (OHI-S) scale of debris present (Figure 8). The plaque index score for an individual is obtained by adding the plaque scores per tooth and dividing by the number of teeth examined[136-138]

Figure 8: The Simplified Oral Hygiene Index



0 = No debris or stain present
1 = Soft debris covering not more than 1/3 of the tooth surface, or presence of extrinsic stains without other debris regardless of surface area covered.
2 = Soft debris covering more than 1/3, but not more than two thirds, of exposed tooth surface.
3 = Soft debris covering more than two thirds of the exposed tooth surface.

iii. Oral Mucosa

Oral mucosa is the primary protective mucous membrane that lines the cavity of the mouth, including the gums. It covers six areas of the oral cavity: lips, buccal mucosa (cheeks), and tongue, floor of the mouth, palate and fauces (throat). A score was allocated per intra-oral mucosal site recording: lesion absent, lesion present (monitor) or lesion present (refer for specialist opinion).

iv. Denture Assessment

The presence of complete (upper and lower) and partial (upper and lower) dentures was recorded. All dentures were examined for stability, retention and occlusion to provide an assessment of overall clinical satisfaction.

4.5 Statistical analysis

The data were returned in the form of completed questionnaires, collated, coded and entered onto an SPSS data base. It was analysed using SPSS version 18.0. The data were subjected to basic statistical analysis in the form of frequency distributions, Chi-squared analysis, t-tests, and Analysis of Variance (ANOVA) with the post hoc Scheffe test to determine statistical differences between groups. The data were also subjected to a principal components analysis, where items are transmogrified into factors and scales which are then subjected to variance analysis, with the internal reliability tested using Cronbach's alpha.

In addition canonical discriminate analysis, which allows variance between groups of cases (in this instance between the groups 'roofless', 'houseless' and 'other homeless') to be summarised was undertaken, which allowed the characteristic of the three groups to be realised. A multi-nominal logistic regression analysis was conducted and included those explanatory factors that were shown to have significant univariate effects with regard to distinguishing between the dependent variable i.e. the ETHOS typology of homelessness ('roofless', 'houseless' and 'other homeless' groups). In this

multi-nominal logistic regression procedure 'houseless' group was used as the reference category and the 'roofless' and 'other homeless' were used for comparison purposes. The statistical procedure allowed characterisation of the ETHOS typology of homelessness.

5.0 Results

5.1 Sample

The survey started in October 2008 to June 2009, and data collection continued for five months. The participants of the survey were sampled in a variety of hostels, refuges, rough sleeper drop-in centres, night shelters, dental surgeries, and multidisciplinary health clinics for homeless people (Table 10). A total of 853 people agreed to participate in the survey. Fifteen percent of the respondents did not consent to an oral examination. The valid response rate was 80%. The majority (60%) of those who refused to participate in the oral examination were aged 25-44 years. The majority of these participants were from the Greater Glasgow and Clyde area (25%), and a minority from Highland (8%), (Table 11).

Table 11: Distribution of participants by NHS Board

NHS Board	Oral Examination		
	Number of compliers	Number of non-compliers	Total
Ayrshire & Arran	102	0	102
Forth Valley	100	5	105
Greater Glasgow & Clyde	118	94	212
Highland	59	8	67
Lanarkshire	102	0	102
Lothian	92	20	112
Tayside	153	0	153
Total	726	127	853

The lack of compliance for examination by some participants led to missing values in the survey data set. The missing values were dealt with in a consistent manner, by replacing the values with mean scores as appropriate. In some instances, where

replacement with missing values was not appropriate (where over 30% of the variables were missing) the cases were dropped from the data analysis.

5.2 *Demographic profile of people experiencing homelessness across Scotland.*

5.2.1 Demographic profile: Gender

Of the participants 74% were male and 26% were female (Table 12).

Table 12: Demographic profile: gender by NHS Board

	AYRSHIRE & ARRAN n (%)	FORTH VALLEY n (%)	GREATER GLASGOW & CLYDE n (%)	HIGHLAND n (%)	LANARKSHIRE n (%)	LOTHIAN n (%)	TAYSIDE n (%)
Male	67 (8)	89 (10)	151 (18)	51 (6)	76 (9)	92 (11)	103 (12)
Female	35 (4)	16 (2)	57 (7)	16 (2)	26 (3)	19 (2)	50 (6)

5.2.2 Demographic profile: age

The age ranged from 16 to 78 years with the median age being 32.50 years. The mean age of the sample was 33.90 years (95%CI: 33.08, 34.73). The majority of the participants were younger than 35 years old (452 participants), with 26.8 percent (229) aged between 16 and 24 years, 27.3% (233) were aged between 25 and 34 years and 23% (197) were aged between 35 and 44 years. The remainder of the sample (21%) were 45 years and over.

Significant differences in mean age were explained by the grouping variable NHS Board ($F[6,825]=15.544$:$P<0.001$). This meant that those participants in NHS Ayrshire and

Arran and NHS Forth Valley were significantly younger than those participating in the other NHS Boards except NHS Lanarkshire (Table 13).

Table 13: Demographic profile: age by NHS Board

	AYRSHIRE & ARRAN	FORTH VALLEY	GREATER GLASGOW & CLYDE	HIGHLAND	LANARKSHIRE	LOTHIAN	TAYSIDE
Mean Age (yrs)	29.71[1*]	26.64[1]	37.22[3]	37.66[3]	30.99[1,2]	35.64[2,3]	36.27[2,3]
95% CI	27.60, 31.82	24.64, 28.64	35.65, 38.79	34.56, 40.75	28.57, 33.41	33.58, 37.70	34.23, 38.31

*The suffixes show the significant differences in age which exist between the participants by NHS Board

For male participants, the mean age was 35.21 years (95%CI: 34.24, 36.19). The mean age of the female participants was 30.00 years (95%CI: 28.57, 31.46). Across all the participating Health Boards the female subjects were younger than the males (F[6,814]=2.75:P=0.01) (Table 14).

Table 14: Demographic profile: by age, gender and NHS Board

NHS Board	Gender	Mean Age (yrs)	95% CI	
Ayrshire & Arran	Male	31.07	28.38	33.76
	Female	27.02	23.25	30.80
Forth Valley	Male	26.03	23.67	28.39
	Female	29.93	24.43	35.44
Greater Glasgow & Clyde	Male	38.61	36.79	40.42
	Female	33.50	30.59	36.42
Highland	Male	40.44	37.30	43.59
	Female	28.53	22.84	34.22
Lanarkshire	Male	33.34	30.81	35.86
	Female	24.11	19.79	28.43
Lothian	Male	36.90	34.53	39.28
	Female	29.23	23.89	34.57
Tayside	Male	38.28	36.11	40.45
	Female	31.95	28.77	35.13

5.2.3 Demographic profile: ethnicity

Over 90% (779) of the sample was Caucasian, with other ethnic groups being represented as follows: African/Caribbean (15), asylum seekers (7), Gypsy/travellers (3), Asian (2) or Chinese (1).

5.2.4 Demographic profile: occupation

The Standard Occupational Classification 2000 (SOC 2000) [138] was used as a comparator when classifying the stated occupations or previous occupations as described by the survey participants. This classification system contains nine major groups. Eight additional occupational categories described those not included in the Standard Occupational Classification list (Table 15). Forty-five percent of the sample did not provide information on their current or previous employment and were assumed to be unemployed. A majority of those participants who did provide occupation were currently employed or had previously worked in skilled trades (25%) or unskilled occupations (21.6%).

5.2.5 Demographic profile: living arrangements

Ninety percent (770) provided information on their current living arrangements. Table 16 provides a summary of the current living arrangements of the sample, where the participants are categorised as 'roofless', 'houseless' or 'other homeless' categories. Hostel residents (31%) and temporary accommodation (20%) accounted for the living arrangements for the majority of participants. Two percent of those interviewed described themselves as rough sleepers. Nine percent of participants stated that they had been recently released from prison or Young Offenders Institute.

Table 15: Demographic profile: stated occupations of participants

Stated occupation	Number	Percentage
Managers & Senior Officials	8	1.7
Professional Occupations	8	1.7
Associate Professional & Technical Occupations	20	4.3
Administrative and Secretarial Occupations	9	1.9
Skilled Trades Occupations	117	25.0
Personal Service Occupations	14	3.0
Sales & Customer Service Occupations	20	4.3
Process, Plant & Machine Operatives	39	8.3
Unskilled Occupations	101	21.6
Unemployed	83	17.7
In Education	13	2.8
Homemaker	6	1.3
Sick/Disabled	8	1.7
Ex-Armed Forces	9	1.9
Ex-prisoner	1	0.2
Occupation not stated or inadequately described	10	2.1
Not classifiable for other reasons	2	0.4

The participants living status was divided into three groups based on ETHOS typological classification [17]. Table 16 shows the number and proportions of the sample who were characterised as 'roofless' (6%); 'houseless' (73%) and 'other homeless' (21%). Eighty-three participants did not reply and were omitted from the statistical analysis.

Table 16: Demographic profile: living arrangements

CATEGORY OF HOMELESSNESS (ETHOS Typology)		Number	%
ROOFLESS	Living rough Night Shelter	46	6
HOUSELESS	Hostel resident/Temporary accommodation Long Stay accommodation Short Stay accommodation Residential care Supported accommodation	560	73
OTHER HOMELESS (Insecure and inadequate housing)	Sofa surfer Reception centres Squatting Released from institutions and insecure accommodation	164	21

Using this categorization of homelessness the majority of participants, were characterised as 'houseless'. Similar proportions of male and female participants were categorised as being 'roofless', 'houseless' or 'other homeless' ($X^2[2]=3.63$:$P=0.16$) (Table 17).

Table 17: Demographic profile: gender by category of homelessness

CATEGORY OF HOMELESSNESS	ROOFLESS n (%)	HOUSELESS n (%)	OTHER n (%)
Male	37 (7)	400 (71)	127 (22)
Female	9 (4)	160 (78)	37 (18)

The grouping variable category of homelessness significantly explained differences in mean age, (F [2,752]=11.679:P<0.001). Those participants who categorised as 'roofless' and 'houseless' were significantly older than those categorised as living in 'other homeless' settings (Table 18).

Table 18: Demographic profile: age by category of homelessness

CATEGORY OF HOMELESSNESS	ROOFLESS	HOUSELESS	OTHER HOMELESSNESS
Mean Age (yrs)	35.82^{2*}	34.67^{2}	29.57^{1}
95%CI	(32.79, 38.75)	(33.60, 35.75)	(27.95, 31.18)

* The suffixes show the significant differences in age which existed between the participants by category of homelessness

Table 19 shows the proportions of participants by NHS Health Board who were 'roofless', 'houseless' and 'other homeless'. Significantly larger proportions of people from Greater Glasgow and Clyde and Lothian were categorised as 'roofless' while those from Forth Valley were categorised as 'other homeless' compared with others.

Table 19: Demographic profile: NHS Health Board by category of homelessness

NHS Board	ROOFLESS n (%)	HOUSELESS n (%)	OTHER HOMELESSNESS n (%)	X^{2}▣	P
Ayrshire & Arran		88 (16)	9 (6)	327.93	<0.001
Forth Valley	3 (7)	14 (3)	83 (51)		
Greater Glasgow & Clyde	20 (44)	121 (22)	31 (19)		
Highland	2 (4)	47 (8)	17 (10)		
Lanarkshire	7 (15)	85 (15)	3 (2)		
Lothian	14 (30)	64 (11)	14 (9)		
Tayside		141 (25)	7 (4)		

▣ Fishers Exact test

5.2.6 Demographic profile: family status

Seventy-seven percent (622) of the sample were single. Twelve percent (103) stated that they lived with a partner. Ten percent of the participants described themselves as living in one-parent (33) or two-parent (47) families. One hundred and five participants stated that they had children of which 44% (46) had one child, 30% (31) had two children, 12% (13) had three children and 14% (15) had four or more children.

One hundred and five of the participants stated they had children. Of these, 80% (87) had children were aged between 16 and 44 years of age. A high number of 16-24 year olds (42%) were living with a partner and significantly larger proportions of those aged 55+ (85%) were single compared with others ($X^2[12]=34.17$:$P=0.001$). Significantly larger proportions of women (56%) compared with men (35%) lived in families with their children ($X^2[2]=72.57$:$P<0.001$). However significantly larger proportions of female (79%) compared with male (21%) participants described themselves as 1 parent families ($X^2[3]=87.28$:$P<0.001$).

Table 20 shows the family status of participants by NHS Board. The majority of participants with children resided in NHS Forth Valley (28%), NHS Greater Glasgow and Clyde (21%) and in NHS Tayside (26%). Significantly larger proportions of participants from NHS Forth Valley were living in two-parent families ($X^2[18]=73.97$:$P<0.001$).

Table 20: Demographic profile: comparison of family status by NHS Board

NHS Board	Family type			
	Single n (%)	With Partner n (%)	1 Parent Family n (%)	2 Parent Family n (%)
Ayrshire & Arran	78 (13)	17(17)	5(16)	0
Forth Valley	59 (10)	19 (18)	3 (9)	22 (47)
Greater Glasgow & Clyde	152 (24)	23 (22)	9 (27)	12 (26)
Highland	51 (8)	10 (10)	3 (9)	1(2)
Lanarkshire	88 (14)	6 (6)	3 (9)	2 (4)
Lothian	82 (13)	11 (11)	2 (6)	2 (4)
Tayside	112 (18)	17 (16)	8 (24)	8 (17)

There was an association between categorisation of homelessness and family type. Significantly larger proportions of people categorised as being 'houseless' were single or lived with their partners compared to 'other homeless' categories (Table 21).

Table 21: Demographic profile: comparison of family status by category of homelessness

CATEGORY OF HOMELESSNESS	ROOFLESS n (%)	HOUSELESS n (%)	OTHER HOMELESS n (%)	X^2 ▣	P
Single	36 (6)	443(75)	103 (18)	28.95	<0.001
With partner	1 (1)	71 (13)	22 (23)		
1 parent family	3 (10)	20 (3)	8 (25)		
2 parent family	4 (10)	17 (3)	20 (48)		

▣ Fisher's exact test

5.2.7 Demographic characterisation of 'houseless', 'roofless' and other participants experiencing homelessness

A multi-nomial logistic regression analysis was conducted to determine the demographic characterisation which defined categorisations of homelessness and the direction of that association. Four independent variables were used and were specified using an indicator coding scheme. These were gender, age, NHS Board of residence and family type. Gender was coded as male=0; female=1 and NHS Board of residence was categorised as mixed rural/urban=0 and urban=1. Age was recoded into 4 age groups (16-24 years=0; 25-34 years=1; 35-45 years =2 and 45 years and over =3) and family type was recoded as 4 subgroups (single=0; partner/no children=1; one-parent family =2; two-parent family =3). All these variables were regressed against the dependent variable categorisation of homelessness. The dependent variable was defined as 'houseless' (=0), 'other homeless' (=1) and 'roofless' (=2). 'Houseless' was used as the reference category.

For those in the 'other homeless' group the relative odds of being male compared with female was 1.79; the relative odds of residing in a mixed rural and urban NHS Board rather than an urban only NHS Board was 2.91 and the relative odds for being in the younger age groups rather than in the oldest age group was 3.09 (16-24 years), 2.84 (25-34 years) and 2.58 (35-44 years) respectively. This means that those in the 'other homeless' group were significantly more likely to be male than female, residing in rural and mixed NHS Boards rather than urban NHS Boards and be younger rather than older age groups compared with those in the reference category of 'houseless'. For single participants or those in a partnership relative to those in a two-parent family the relative risk for being 'houseless' compared with being 'other homeless' would be expected to decrease by 0.19 and 0.23 respectively. This means that participants who were single or in a partnership were significantly less likely to be in the 'houseless' group than the 'other homeless' group relative to those in two parent families.

For single participants or those in a partnership relative to those in a two-parent family the relative risk for being 'houseless' compared with being 'roofless' would be expected to decrease by 0.29 and 0.06 respectively. This means that participants who were single were significantly less likely to be in the 'houseless' group than in the 'roofless' group, relative to those in two-parent families. Also, participants who were in a partnership were less likely to be in the 'houseless' group than in the 'roofless' group. No other significant effects were shown (Table 22).

Table 22: Characterisation of 'houseless', 'other homeless' and 'roofless' participants by demography

⧈Other homeless	Odds ratio Exp (B)	95%CI	P
⌖NHS Board	2.91	1.91, 4.43	<0.001
¥Family type			
Single	0.19	0.09, 0.40	<0.001
with partner	0.23	0.10, 0.56	0.001
single parent	0.44	0.14, 1.35	0.16
□Gender	1.79	1.10, 2.93	0.02
▣Age group			
16-24 years	3.09	1.59, 5.96	0.001
25-34 years	2.84	1.45, 5.56	0.002
35-44 years	2.58	1.28, 5.21	0.008
Roofless	**Odds ratio Exp (B)**	**95%CI**	**P**
NHS Board	0.59	0.29, 1.22	0.09
Family type			
Single	0.29	0.08, 0.95	0.04
with partner	0.06	0.007, 0.62	0.02
single parent	0.71	0.13, 3.82	0.69
Gender	2.18	0.87, 5.32	0.15
Age group			
16-24 years	0.82	0.25, 2.66	0.74
25-34 years	1.96	0.79, 4.79	0.14
35-44 years	1.98	0.79, 4.89	0.15

⧈ Characterisation of homelessness**:** reference group: 'Houseless' =0

⌖ NHS Board: reference group: urban=1

¥ Family type: reference group: two parent family=3

□ Gender: reference group: female=1

▣ Age group: reference group: 45 and over years=3

5.3 Health behaviours and health status

Assessment of general health needs and health-related behaviours

5.3.1 Health behaviours: tobacco use

Seven hundred and twenty of the sample (85%) described themselves as 'smokers', with equivalent proportions of male (85%) and female (85%) participants stating that they smoked tobacco. Significantly smaller proportions of participants aged 55 years and older stated that they smoked tobacco compared with other age groups ($X^2[4]=21.67$: $P<0.001$) (Table 23).

Table 23: Health behaviours: comparison of the proportions of smokers by age

Tobacco use	Age group				
	16 and24 YEARS n(%)	25 and 34 YEARS n(%)	35 and 44 YEARS n(%)	45 and 54 YEARS n(%)	55 + YEARS n(%)
Yes	183 (80)	205 (88)	182 (92)	98 (84)	41 (73)
No	46 (20)	28 (12)	15 (8)	19 (16)	15 (27)

The mean number of cigarettes smoked daily was 19.12 with a reported range smoked from 1 to 120 daily. The grouping variable age group significantly explained differences in the mean number of cigarettes reported to be smoked daily (Table 24). The grouping variable category of homelessness significantly explained the mean number of cigarettes smoked daily. Participants categorised as 'houseless' reported to smoke significantly lower mean numbers of smoking compared with those in 'roofless' groups (Table 24).

Table 24: Health behaviours: comparison of the average number of cigarettes reportedly smoked daily by age

AGE GROUP	MEAN CIGARETTES SMOKED MEAN (95% CI)	F (df)	P
16-24 YRS	17.05 (15.06,19.83)	2.78 (4,646)	0.03
25-34 YRS	18.38 (16.64,20.11		
35-44 YRS	20.30 (18.35,22.25)		
45-54YRS	21.58 (18.32,24.85)		
55+ YRS	22.18 (17.20,27.15)		
CATEGORY OF HOMELESSNESS	MEAN CIGARETTES SMOKED MEAN (95% CI)	F (df)	P
ROOFLESS	24.32[2] (18.10, 30.54)	3.45 (2,612)*	0.02
HOUSELESS	18.49[1](17.40, 19.58)		
OTHER	20.05,[1,2] (17.23, 22.87)		

*The suffixes show the significant differences in mean number of cigarettes smoked which existed between the participants' category of homelessness grouping.

5.3.2 Health behaviours: alcohol use

Thirty-one percent (254) of the participants stated that they drank alcohol at least daily. Significantly lower proportions of female (19%) participants reported to drink alcohol at least daily compared with male (35%) participants ($X^2[1]=18.74$:$P<0.001$). Significantly lower proportions of participants aged between 25-34 years reported to drink alcohol compared with participants in the other age groups (Table 25).

Significantly lower proportions of 'roofless' participants compared with the other participants who were either 'houseless' or 'other homeless' stated they drank alcohol at least daily.

Table 25: Health behaviours: alcohol consumption: comparisons by age group and category of homelessness

AGE GROUP	**REPORTED TO CONSUME ALCOHOL AT LEAST DAILY** n(%	**REPORTED NOT TO CONSUME ALCOHOL AT LEAST DAILY n(%)**	**X^2 (df)**	**P**
16-24 YRS	70 (9)	150 (19)	12.6 (4)	0.02
25-34 YRS	49 (6)	174 (23)		
35-44 YRS	66 (8)	122 (15)		
45-54YRS	40 (5)	69 (9)		
55+ YRS	19 (2)	35 (5)		
CATEGORY OF HOMELESSNESS	**REPORTED TO CONSUME ALCOHOL AT LEAST DAILY** n (%)	**REPORTED NOT TO CONSUME ALCOHOL AT LEAST DAILY** n (%)	**X^2 (df)**	**P**
ROOFLESS	22 (9)	23 (4)	7.26 (2)	0.02
HOUSELESS	163 (69)	388 (75)		
OTHER	50 (21)	107 (21)		

5.3.3 Health behaviours: drug use

A total of 564 participants (68%) stated that they had used drugs at some time in their lives. Two hundred and thirty-six participants (29%) stated that they were current drug users at the time of the survey. One hundred and ninety-one participants (24%) who currently stated that they were current drug users stated that they were injecting drug users at the time of the survey. Sixty-eight percent of men (419) and 66% of women (144) reported to have used drugs in the past with equivalent proportions of men (30%) and women (26%) stated that they continued to take drugs. Twenty-three percent of men and 29% of women stated that they were injecting drug users at the time of the survey.

There was a significant association between ever having used drugs and age group with significantly lower proportions of older participants stating that they had previously used drugs compared with those in other age groups (Table 26). There was an associated between injecting drug use and age. Significantly larger proportions of participants aged between 25-34 years (40%) and between 35-44 years (32%) compared with those in the 16-24 years (15%), 45 years and over (19%) age groups ($X2[3]=39.17$:$P<0.001$), stating that they had injected drugs.

There was a significant association between previously having used drugs and categorisation of homelessness. Significantly greater proportions of participants in the 'other homeless' group, compared with those categorised as 'houseless' or 'roofless' groups, stated that they had previously used drugs (Table 26). Significantly larger proportions of those categorised as 'houseless' (68%) reported to be injecting drug users compared with those who were categorised as 'other homeless' (21%) and 'roofless' (11%) ($X2[2]=9.45$:$P=0.009$).

Table 26: Health behaviours: Drug use and age

AGE GROUP	PREVIOUS DRUG USE		X^2 (df)	P
	YES n(%)	NO n(%)		
16-24 YRS	156 (20)	72 (9)	121 (4)	<0.001
25-34 YRS	197 (24)	32 (4)		
35-44 YRS	138 (17)	52 (6)		
45-54YRS	49 (6)	63 (8)		
55+ YRS	12 (1)	44 (5)		
CATEGORY OF HOMELESSNESS	PREVIOUS DRUG USE		X^2 (df)	P
	YES n(%)	NO n(%)		
ROOFLESS	33 (4)	12(3)	23.67 (2)	<0.001
HOUSELESS	348 (45)	209 (27)		
OTHER	134 (17)	29 (4)		

5.3.4 Health behaviours: characterisation of 'roofless', 'other homeless' and 'houseless' participants

A multinomial logistic regression analysis was conducted to determine the health-related behavioural profile of 'houseless', 'other homeless' and 'roofless' people, and the direction of that association. The independent variables were specified using an indicator coding scheme. Health behaviours were cigarette smoking; previous drug use; injecting drug use; current drug use and alcohol use (all coded yes=0 and no=1). All these variables were regressed against the dependent variable categorisation of homelessness. All these variables were regressed against the dependent variable categorisation of homelessness. The dependent variable was defined as 'houseless' (=0), 'other homeless' (=1) and 'roofless' (=2). 'Houseless' was used as the reference category.

For previous drug users compared to those with no history of previous drug use the relative risk for being 'other homeless' relative to the reference category 'houseless' would be expected to increase by a factor of 3.69 given that all other factors in the model are kept constant. This means that previous drug users are significantly more likely than non-previous drug users to be 'other homeless' than 'houseless'. For smokers relative to non-smokers the relative risk for being 'other homeless' relative to the reference category 'houseless' would be expected to decrease by a factor of 0.49 given that the other variables in the model are kept constant. This means that smokers are significantly less likely than non-smokers to be categorised as 'houseless'.

For those who were injecting drug users compared with non-injecting drug users the relative risk for being 'roofless' relative to the referent category 'houseless' would expect to increase by a factor of 2.42 given that all other factors in the model are kept constant. This means that injecting drug users were significantly more likely than non-injecting drug users to be 'roofless' than houseless. For those who used alcohol relative to non-alcohol users the relative risk for being 'roofless' relative to the referent category 'houseless' would be expected to increase by a factor of 2.21 given that all other factors in the model are kept constant. In other words, injecting drug users and smokers would be significantly more likely than non-injecting drug users and non-alcohol users to be 'roofless' rather than 'houseless' (Table 27).

Table 27: Characterisation of 'houseless', 'other homeless' and 'roofless' participants by health behaviours

⧈Other homeless	Odds ratio Exp (B)	95%CI	P
Previous drug use⌖	3.69	2.21, 6.18	<0.001
Injecting drug use¥	0.74	0.46, 1.17	0.19
Alcohol use□	1.16	0.77, 1.74	0.48
Cigarette smoking▣	0.49	0.29, 0.83	0.008
Rooflessness	**Odds ratio Exp (B)**	**95%CI**	**P**
Previous drug use	1.05	0.45, 2.41	0.92
Injecting drug use	2.42	1.16, 5.02	0.02
Alcohol use	2.21	1.18, 4.14	0.01
Cigarette smoking	1.70	0.49, 5.92	0.40

⧈ Characterisation of homelessness**:** reference group: 'Houseless' =0

⌖ previous drug use: reference group: no=1

¥ injecting drug use: reference group: no=1

□ Alcohol use: reference group: no=1

▣ Cigarette smoker: reference group: no=1

5.3.5 Physical health

Four hundred and sixty of the participants (54%) reported that they were receiving medical treatment. Of the diseases experienced by the participants, respiratory diseases were the most commonly reported, with 22% (n=187) of the sample suffered from chest disease. Eighteen percent (n=153) reported that they bruised or bled easily; 19% stated that they had 'allergies'; 13% (n=110) stated that they suffered from 'blood pressure' and 11% of the total sample stated that they were HIV/Hepatitis C positive.

Other illnesses experienced included epilepsy (6%), heart disease (6%) and diabetes (3%).

5.3.51 Physical health: comparison by gender

There was a significant association between reported physical illness and gender. Larger proportions of women compared with men stated that they had chest disease ($X^2[1]=9.06$:$P=0.003$), a bleeding disorder ($X^2[1]=31.64$:$P<0.001$) and suffered from allergies ($X^2[1]=7.40$:$P=0.007$).

5.3.52 Physical health: comparison by age group

Significantly greater proportions of participants in the 25-34 year old age group and in the 35-44 year old age group were HIV and/or Hepatitis C positive compared with other age groups. Significantly larger proportions of participants in the 24- 54 year age groups compared with others stated that they suffered from epilepsy. Significantly lower proportions of older participants (over 55 years) reported that they had respiratory disease, bleeding problems or allergies compared with other age groups whereas significantly larger proportions of older age groups compared with others had heart disease (Table 28).

Table 28: Health: physical health comparisons by age group

AGE GROUP	16-24 YRS n (%)	25-34 YRS n (%)	35-44 YRS n (%)	45-54 YRS n (%)	55 YEARS + n (%)	X^2 (df)†	P
Respiratory disease	45 (5)	50 (6)	39 (5)	30 (4)	17 (2)	4.17	0.38
Heart Disease	6 (3)	6 (3)	11 (23)	12 (26)	12 (26)	38.89	<0.001
Hypertension	15 (2)	18 (2)	27 (3)	29 (4)	21 (3)	58.26	<0.001
HIV/Hep C positive	7 (0.8)	33 (4)	34 (4)	8 (1)	4 (0.5)	29.77	<0.001
Epilepsy	5 (0.6)	12 (1)	11 (1)	10 (1)	7 (0.8)	12.3	0.01
Diabetes	5 (0.6)	4 (0.5)	4 (0.5)	8 (1)	2 (0.2)	8.9	0.06
Bleeding disorder	35 (4)	45 (5)	37 (5)	24 (3)	10 (6)	2.25	0.69
Allergies	36 (5)	40 (5)	37 (5)	28 (3)	10 (6)	3.77	0.43

† df=4

5.3.53 Physical health: comparison by category of homelessness

Significantly lower proportions of participants who were categorised as being 'other homeless' reported that they were suffering from hypertension, than other groups (Table 29).

Table 29: Health: physical health comparisons by category of homelessness

	ROOFLESS n (%)	HOUSELESS n (%)	OTHER HOMELESS n (%)	X^2 (df)††	P
Respiratory disease	8 (1)	132 (17)	32 (4)	3.10	0.78
Heart Disease	4 (9)	33 (6)	9 (4)	2.09	0.35
Hypertension	6 (14)	85 (15)	11(7)	8.21	0.02
HIV/Hep C positive	5 (11)	60 (11)	16 (10)	0.14	0.93
Epilepsy	6 (1)	30 (4)	4 (1)	9.21	0.06
Diabetes†	0 (0)	21 (3)	1(0.1)		0.11
Bleeding disorder	8 (17)	108 (19)	27 (16)	2.14	0.34
Allergies	7 (1)	108 (14)	28 (4)	3.12	0.78

† Fishers' exact probability test used here
†† df=2

5.3.54 Physical health: prescribed drugs

A large proportion (63%) of the sample (496 people) stated that they were taking prescribed medication. Analysis across the whole study sample (853 total participants) meant that 35% of the population was taking medication aimed at treating mental ill-health.

Four hundred and seventy-two participants provided details of the type of medication they were currently taking. The largest proportions of prescribed medication were

anti-depressants (17.94%), methadone (17.94%), anxiolytics (11.50%) and anti-psychotic

(5.98%) medication (Table 30).

Table 30: Current prescribed medication

MEDICATION	Number of patients taking prescribed medication (n=472)	Percentage of patients taking medication %	Percentage of full sample(n=853) %
Anti-depressants	153	32.42	17.94
Methadone	153	32.42	17.94
Chest/asthma medication	128	27.12	15.01
Anxiolytics	95	20.34	11.50
Analgesics	64	13.56	7.50
Anti-psychotics	51	10.81	5.98
Vitamins	43	9.11	5.04
GIT medication	30	6.36	3.52
Anti-epileptics	29	6.14	3.40
Anti-hypertensives	27	5.72	3.17
Anti-inflammatories	24	5.08	2.81
Antibiotics	23	4.87	2.70
Cardiac medication	15	3.18	1.76
Muscle relaxant	14	2.97	1.64

5.3.55 Physical health: prescribed drugs and demography

Significantly larger proportions of female (70%) compared with male (60%) participants stated that they were taking prescribed medication at the time of the survey ($X2[1]=6.12$: $P=0.01$).

Significantly larger proportions of younger participants reported not taking prescribed medication as compared with those aged older age groups (Table 31).

Significantly lower proportions of participants described as 'roofless' reported that they were taking prescribed medication than those who were either 'houseless' or 'other homeless' (Table 31)

Table 31: Comparison of prescribed medication: comparison by age group and category of homelessness

AGE GROUP	PRESCRIBED MEDICATION		X^2 (df)	P
	YES n (%)	NO n (%)		
16-24 YRS	93 (12)	112 (15)	50.47 (4)	<0.001
25-34 YRS	154 (20)	64 (8)		
35-44 YRS	120 (16)	59 (7)		
45-54YRS	82 (11)	28 (4)		
55+ YRS	38 (18)	18 (2)		
CATEGORY OF HOMELESSNESS	PRESCRIBED MEDICATION		X^2 (df)	P
	YES n(%)	NO n(%)		
ROOFLESS	28 (4)	14 (2)	10.91 (2)	0.02
HOUSELESS	344 (47)	189 (26)		
OTHER HOMELESS	85 (11)	62 (9)		

5.3.6 Characterisation of health and health behaviours for the 3 categories of homelessness: 'roofless', 'houseless' and 'other homeless'

A canonical discriminant analysis of the three categories of homelessness was conducted against the independent health behaviours and health variables which had

been shown to distinguish between the groups. These were alcohol consumption, cigarette smoking, previous drug use, injecting drug use, hypertension, and prescribed medication. The analysis showed that the three categories of homelessness could be discriminated by 2 canonical functions (Table 32), approximating to 2 dimensions of health and health behaviour.

Table 32: Pooled within-groups correlations between discriminating variables and standardised canonical discriminant functions: health

	Function 1	Function 2
Previous drug use	**0.82**	0.49
Hypertension	**0.49**	-0.20
Injecting drug use	0.10	**0.79**
Cigarette smoking	-0.02	**0.47**
Prescribed medicines	-0.29	**0.66**

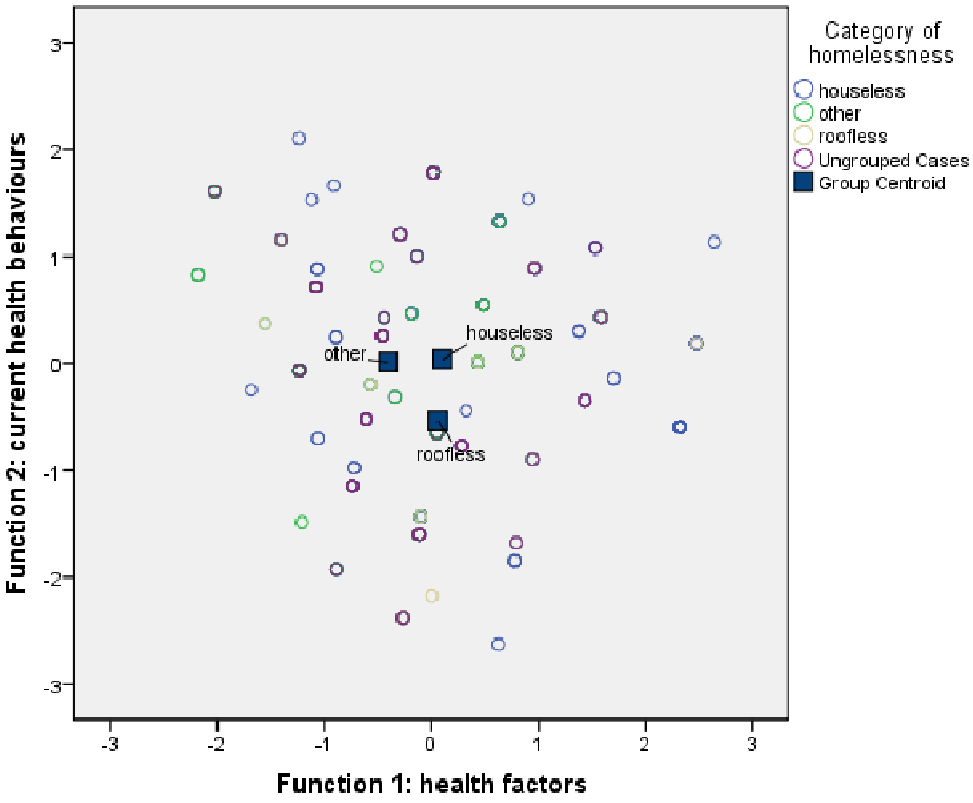
Function 1 related to health factors and accounted for 70.2% of the in group variance. Function 2 related to current health behaviours and accounted for 29.8% of the in-between group variance (Table 33, Figure 9).

Table 33: Eigenvalues for the 2 canonical discriminant Functions: health

Function	Eigenvalue	% of Variance	Canonical Correlation
1	0.04	70.2	0.20
2	0.02	29.8	0.13

Those categorised as 'other homeless' were characterised by Function 1 - a history of prior drug use and being hypertensive. People who were categorised as 'roofless' were characterised by Function 2 suggesting that they were more likely to have been an injecting drug user, used alcohol, smoked cigarettes and taken prescribed medication. 'houseless' participants were described weakly by Function 1 and Function 2.

Figure 9: Category of homelessness: canonical discriminant functions – health behaviours



5.4 Oral health and oral health behaviours

Seven hundred and twenty-eight (85%) participants took part in the oral health examination (some participants did not consent to having an oral examination).

5.4.1 Obvious decay experience: the total sample

Table 34 shows the mean, 95% confidence intervals and median for the number of decayed, missing and filled teeth. In this sample, 27% of obvious decay experience was composed of decayed teeth (visual decay into dentine), 52% by missing teeth and 22% by filled teeth.

Table 34: Oral health: obvious decay experience

OBVIOUS DECAY EXPERIENCE	MEAN (95%CI)	MEDIAN
Decayed teeth (D_{3cv})	4.48 (4.10, 4.87)	3.00
Missing teeth (M)	8.71 (8.06, 9.36)	5.00
Filled teeth (F)	3.79 (3.50, 4.08)	2.00
$D_{3cv}MFT$	16.98 (16.32, 17.64)	17.00
Standing teeth	21.39 (20.75, 25.02)	24.00

5.4.11 Obvious decay experience: comparisons by gender

The women had significantly lower mean numbers of filled teeth compared with the men. At the 8% level of significance the women compared with the men had greater mean numbers of decayed teeth (Table 35).

Table 35: Oral health: mean obvious decay experience: comparisons by gender

OBVIOUS DECAY EXPERIENCE	GENDER		t	P
	Male	Female		
Decayed teeth (D_{3cv}) MEAN	4.29 (4.95)	5.06 (5.89)	1.21	0.08
Missing teeth MEAN	8.97 (8.89)	8.00 (8.94)	1.60	0.20
Filled teeth MEAN	3.97 (4.10)	3.26 (3.65)	4.50	<0.05
D_{3cv}MFT MEAN	17.32 (9.00)	16.32 (8.95)	1.28	0.25
Standing Teeth MEAN	21.2 (8.68)	21.87 (8.75)	1.28	0.36

5.4.12 Obvious decay experience: comparisons by age group

Statistically, significant differences in mean number of decayed teeth (D_{3cv}), missing teeth and filled teeth were explained by the grouping variable age group. Participants aged between 25 and 44 years had significantly greater mean numbers of teeth decayed into dentine compared with the other age groups. As might be expected, people in the oldest age groups (45-54 years and 55+) had significantly greater mean numbers of missing teeth than others. People in the youngest age group (16-24 years) had significantly fewer filled teeth compared those aged between 45 and 54 years and significantly greater numbers of standing teeth compared with all other age groups (Table 36).

Table 36: Oral health: mean obvious decay experience: comparisons by age group

OBVIOUS DECAY EXPERIENCE	16-24 YRS (N=207) MEAN (95%CI)	25-34 YRS (N=194) MEAN (95%CI)	35-44 YRS (N=160) MEAN (95%CI)	45-54 YRS (N=96) MEAN (95%CI)	55 YEARS + (N=57) MEAN (95%CI)	F(df)	P
Decayed teeth (D_3)	4.05[1†] (3.34,4.77)	6.24[2] (5.37,7.11)	4.14[1,2] (3.48,4.79)	3.16[1] (2.34, 3.97)	2.75[1] (1.47, 4.02)	9.47 (4,703)	<0.001
Missing teeth	2.90[1] (2.36,3.44)	7.97[2] (6.89,9.06)	11.86[,4] (10.42,13.31)	13.40[3,4] (11.52, 15.27)	16.55[4] (13.30,19.80)	56.94 (4.703)	<0.001
Filled teeth	3.09[1] 2.62,3.56)	3.60[,2] (3.08,4.11)	4.02[1,2] (3.40,4.63)	5.07[1,2] (4.12,6.02)	4.02 (2.64,5.40)	4.56 (4.703)	<0.001
D_{3cv}MFT	9.94[1] (8.92,10.97)	17.64[2] (16.53,18.75)	20.01[,3] (18.73,21.30)	21.61[3,4] (20.18,23.05)	23.31[4] (21.29,25.34)	67.8 (4.703)	<0.001
Standing teeth	26.45[4] (25.88,27.02)	22.43[3] (21.35,23.50)	18.51[2] (17.10,19.91)	17.03[2] (15.09,18.97)	13.34[1] (10.37,16.49)	49.49 (4.703)	<0.001

† The suffixes show the significant differences in obvious decay experience between the participants' age groups.

5.4.13 Obvious decay experience: comparisons by category of homelessness

The grouping variable category of homelessness significantly explained differences in mean number of missing teeth, mean $D_{3cv}MFT$ and mean number of standing teeth. Those participants who were categorised as 'roofless' had significantly higher mean numbers of missing teeth and D_{3cv} when compared with those participants who were categorised as 'other homeless' (Table 37).

Table 37: Oral health: mean obvious decay experience: comparisons by category of homelessness

OBVIOUS DECAY EXPERIENCE	ROOFLESS (N=34) MEAN (95%CI)	HOUSELESS (N=505) MEAN (95%CI)	OTHER HOMELESS (N=135) MEAN (95%CI)	F (df)	P
Decayed teeth (D_{3cv})	5.03 (3.24, 6.82)	4.61 (4.13, 5.09)	3.83 (3.09, 4.57)	1.38 (2,671)	0.25
Missing teeth	10.68[2†] (7.34, 14.02)	9.13[1,2] (8.31, 9.94)	6.44[1] (5.26, 7.63)	5.69 (2,671)	0.04
Filled teeth	4.56 (2.93, 6.19)	3.59 (3.24, 3.93)	3.93 (3.31, 4.55)	1.25 (2,671)	0.29
$D_{3cv}MFT$	20.21[2] (17.31, 23.10)	17.21[1,2] (16.41, 18.02)	14.20[1] (12.78, 15.62)	8.87 (2,671)	<0.001
Standing teeth	20.41[1] (17.21, 23.61)	20.93[1] (20.13, 21.73)	23.33[1] (22.16, 24.51)	4.23 (2,671)	0.02

†The suffixes show the significant differences which existed between the participants' category of homelessness grouping.

5.4.2 Periodontal Disease

5.4.21 Plaque status

The total mean plaque score for the sample population was 1.08 (95%CI: 1.01, 1.15). The mean plaque score for the upper teeth was 1.06 (95%CI: 0.99, 1.13) and for the lower teeth 1.10 (95% CI 1.04, 1.16).

5.4.22 Plaque: comparisons by gender and age group

There was no difference in mean plaque scores between male (1.16) and female (1.06) participants (t=1.49:P=0.14). Sixteen to 24 year-olds had significantly lower total mean plaque scores compared with other age groups (F[4]=10.56:P<0.001).

Table 38: Oral health: mean plaque scores: comparisons by age group

PLAQUE SCORE	16-24 YRS (N=207) MEAN (95%CI)	25-34 YRS (N=185) MEAN (95%CI)	35-44 YRS (N=143) MEAN (95%CI)	45-54 YRS (N=86) MEAN (95%CI)	55 YEARS + (N=36) MEAN (95%CI)	F(df)	P
Upper teeth plaque score	0.83[1] (0.72, 0.94)	1.18[1,2] (1.04, 1.32)	1.15[1,2] (1.02, 1.28)	1.17[1,2] (0.96, 1.38)	1.35[2] (0.96, 1.74)	6.19 (4,599)	<0.00
Lower teeth plaque score	0.86[1] (0.75, 0.96)	1.25[1,2] (1.12, 1.37)	1.24[1,2] (1.11, 1.38)	1.34[2] (1.14, 1.55)	1.57[2] (1.22, 1.91)	10.56 (4,619)	<0.00
Full mouth teeth plaque score	0.85[1] (0.75, 0.95)	1.22[1,2] (1.10, 1.34)	1.22[1,2] (1.09, 1.36)	1.33[2] (1.13, 1.52)	1.57[2] (1.22, 1.91)	10.56 (4,652)	<0.00

[†] The suffixes show the significant differences which existed between the participants' age grouping.

5.4.23 Plaque: comparisons by category of homelessness

The grouping variable category of homelessness significantly explained differences in upper, lower and total plaque scores. Those participants categorised as having homelessness other than 'roofless' or 'houseless' had significantly lower mean plaque scores for upper teeth, lower teeth and also had lower total mean plaque scores when compared with other category of homelessness groups (Table 39).

Table 39: Oral health: mean plaque scores: comparisons by category of homelessness

PLAQUE SCORE	ROOFLESS (N=34) MEAN (95%CI)	HOUSELESS (N=505) MEAN (95%CI)	OTHER HOMELESSNESS (N=135) MEAN (95%CI)	F (df)	P
Upper teeth plaque score	1.23[2†] (0.90, 1.55)	1.14[2] (1.06, 1.22)	0.71[1] (0.56, 0.85)	13.04 (2, 570)	<0.001
Lower teeth plaque score	1.26[2] (0.91, 1.60)	1.23[2] (1.16, 1.31)	0.80[1] (0.65, 0.95)	13.67 (2, 619)	<0.001
Full mouth teeth plaque score	1.20[2] (0.90, 1.58)	1.22[2] (1.14, 1.29)	0.80[1] (0.65, 0.95)	12.76 (2, 622)	<0.001

[†] The suffixes show the significant differences in mean plaque scores which existed between the participants' category of homelessness grouping.

5.4.3 Oral mucosal lesions by demography

Six areas of the mouth and throat were examined. These were the lips, buccal mucosa (cheeks), tongue under the tongue (floor of mouth), palate and the throat (oropharynx). A minority of the sample had a suspicious lesion on their lips (3%), buccal mucosa (4%), tongue (1%), under their tongue (0.3%), palate (2%) and/or throat (0.2%). Nine percent (61) of the sample had one suspicious oral mucosal lesion and 6 participants had two

suspicious lesions. Male participants had a higher incidence of suspicious oral lesions affecting the lips ($X^2[2]= 1.073$:$P<0.585$), the buccal mucosa ($X^2[2]= 4.752$:$P<0.093$), the floor of mouth region ($X^2[1]= 0.701$:$P<0.402$) and the palate ($X^2[1]= 0.543$:$P<0.703$).

Participants aged between 45 and 54 years (27%) and those aged 55 and over (46%) had greater experience of suspicious lesions on the palate compared with other age groups ($X^2[4]= 27.82$:$P<0.001$). No other differences between age groups were shown for suspicious lesions of the lips, buccal mucosa, tongue, under the tongue or throat.

The majority of suspicious mucosal lesions were found in participants who were categorised as 'houseless', with 47 hostel residents having up to 2 suspicious lesions compared with 2 participants categorised as 'roofless' and 7 'other homeless' participants. Five participants with suspicious lesions were referred to secondary services.

5.4.4 Oral health status: edentulousness and demography

Forty-six people were edentulous. This represented only 6% of the sample population. The greatest proportion of participants with no natural teeth was aged between 35 and 44 years of age. Thirty-seven percent of this age group were edentulous. Six percent (33) of men and 7% (13) of women were edentulous ($X^2[1]=0.16$: $P=0.69$). Significantly greater proportions of participants categorised as 'roofless' (11%) were edentulous compared with those participants categorised as 'houseless' (7%) and 'other homeless' (2%) ($X^2[2]=6.16$:$P=0.46$).

5.4.5 Oral health status: dentures worn by demography

A total of 139 people in the sample were noted as wearing some type of denture at the time of the survey. Seventy-one of the participants wore complete upper dentures and 28 wore complete lower dentures. Seventy-one of the participants wore upper partial

dentures and 18 wore partial lower dentures. Forty-four participants had both upper and lower full dentures and 7 had upper and lower partial dentures. Four dentures (1 complete upper denture and 3 partial lower dentures) were lost. Fifty percent of upper complete and partial dentures were judged to be clinically satisfactory. One-third of those with lower dentures had partial dentures.

Of the denture wearers, larger proportions of male participants wore complete upper (36%) and partial (43%) dentures compared with the female participants who wore complete (14%) and partial (11%) dentures ($X^2[2]=4.39$:P=0.11).

Of the 139 people who wore partial and complete upper dentures at the time of the survey, A significantly larger proportion were aged between 35 and 44 years of age ($X^2[4]=19.08$:P=0.01) compared with other age groups. A larger percentage of participants aged between 45 and 54 years of age wore partial lower dentures (44%), whereas a larger proportion of participants aged 55 years and over (36%) wore complete lower dentures ($X^2[4]=9.22$:P=0.16).

5.4.6 Characterisation of oral health for the 3 categories of homelessness: 'roofless', 'houseless' and 'other homeless'

A canonical discriminant analysis of the three categories of homelessness was conducted against the independent oral health factors which had been shown to distinguish between the groups. These were obvious decay experience ($D_{3cv}MFT$), missing teeth, standing teeth, total plaque scores, upper plaque scores, lower plaque scores, oral mucosal lesions, edentulousness.

The analysis showed that the three categories of homelessness could be discriminated by 2 canonical functions (Table 40), approximating to 2 dimensions of oral health.

Table 40: Pooled within-groups correlations between discriminating variables and standardised canonical discriminant functions: oral health

	Function 1	Function 2
Lower plaque score	**0.92**	-0.21
Total plaque score	**0.89**	-0.15
Upper plaque score	**0.79**	-0.07
Mucosal lesion	**0.26**	-0.27
Standing teeth	**-0.26**	-0.03
Obvious decay experience (D_{3cv}MFT)	0.49	**0.55**
Missing teeth	0.37	**0.39**

Function 1 related to oral health status and accounted for 85% of the in group variance. Function 2 related to dental caries status and accounted for 15% of the in between group variance (Table 41).

Table 41: Eigenvalues for the 2 canonical discriminant functions: oral health

Function	Eigenvalue	% of Variance	Canonical Correlation
1	0.07	85	0.23
2	0.01	15	0.11

People who were categorised as 'houseless' were characterised by Function 1 – being more likely to have high plaque scores and mucosal lesions with fewer numbers of standing teeth. People categorised as 'roofless' were characterised by both functions having a combination of oral and dental (tooth) disease. People who were categorised as 'other homeless' were characterised by Function 1 having lower plaque scores, more standing teeth and absence of mucosal lesions (Figure 10).

Figure 10 Category of homelessness: canonical discriminant functions – oral health

5.4.7 Dental attendance, treatment experiences and attitudes to dental care

Of the total sample, 31% reported that they were currently registered with a dentist. Fifty-four percent (459) stated they had not visited the dentist for at least 10 years. Smaller proportions had visited the dentist within a year of the survey (15%), in the previous 2 years (8%), within 5 years of the survey (14%) or between 6 and 10 years ago (9%). Of those reporting the reason for their last visit, 68% (752) stated that they had attended the dentist because of pain, discomfort or trouble with their teeth. Only 21% of the total sample had attended for a routine dental examination or check-up.

Reported dental treatment experiences are outlined in Table 42, with injection in the gum (88%) and fillings (85%) being the most commonly reported treatments. Dental

treatment experiences were divided into 3 broad category groups dental treatment (fillings, extractions and dentures), preventive dental treatments (fluoride treatments, fissure sealants, scale and polish) and treatment for dental anxiety (relative analgesia, IV sedation) and were compared by demography.

Table 42: Dental treatment: reported dental treatment ever received

	TREATMENT RECEIVED n (%)	TREATMENT NOT RECEIVED n (%)	CANNOT REMEMBER n (%)
Fillings	723 (85)	80 (9)	50 (6)
Injection in gum	751 (88)	7 (7)	45 (5)
Injection in arm (IV sedation)	259 (30)	518 (61)	76 (8)
X-rays	647 (76)	128 (15)	78 (9)
Extractions	650 (76)	140 (16)	63 (7)
Laughing gas (RA)	233 (27)	508 (60)	112 (13)
Fluoride treatments	119 (14)	494 (58)	240 (28)
Fissure sealants	114 (13)	480 (56)	259 (31)
General anaesthetic (gas)	338 (40)	415 (49)	100 (11)
Abscess	494 (58)	275 (32)	84 (10)
Crowns	189 (22)	545 (64)	119 (14)
Bridge work	93 (11)	625 (73)	135 (16)
Scale and polish	473 (55)	299 (35)	81 (9)
Dentures	257 (30)	526 (62)	70 (8)

5.4.71 Dental treatment experiences by gender

Significantly larger proportions of male participants stated that they had had fluoride treatment compared with the women. No other significant differences were noted. (Table 43).

Table 43: Dental treatment experiences by gender

	MALE n (%)	FEMALE n (%)	X^2 (df)†	P
Dental treatments				
Fillings	531 (88)	192 (90)	3.59	0.17
Extractions	484 (81)	166 (79)	2.19	0.34
Dentures	191 (32)	66 (31)	0.15	0.92
Preventive treatments				
Fluoride treatments	92 (16)	27 (13)	7.69	0.02
Fissure sealants	78 (14)	17 (36)	2.78	0.25
Scale and polish	347 (58)	125 (58)	0.15	0.99
Dental anxiety treatments				
Laughing gas (RA)	173 (30)	60 (29)	3.55	0.17
Injection in arm (IV sedation)	193 (33)	65 (31)	1.16	0.56

† df=1

5.4.72 Dental treatment experiences by age group

Significantly lower proportions of participants aged 55 years and older stated that they had had experience of fillings and extractions compared with other age groups. Significantly greater proportions of participants aged 35-44 years stated that they had

been provided with dentures compared with other age groups. Significantly smaller proportions of participants aged 55 years and older had experience of fissure sealants or scale and polish compared with other age groups. No other significant differences were demonstrated (Table 44).

Table 44: Dental treatment experiences by age group

	16-24 YRS n (%)	25-34 YRS n (%)	35-44 YRS n (%)	45-54 YRS n (%)	55+ YRS n (%)	X^2(df)†	P
Dental treatments							
Fillings	187 (26)	197 (28)	169 (24)	106 (15)	48 (7)	12.12	0.02
Extractions	197 (28)	182 (29)	165 (26)	102 (16)	3 (2)	80.00	<0.001
Dentures	25 (10)	62 (24)	78 (31)	56 (22)	33 (13)	90.99	<0.001
Preventive treatments							
Fluoride treatments	29 (25)	35 (30)	33 (29)	16 (15)	2 (1)	7.83	0.10
Fissure sealants	46 (42)	30 (27)	26 (24)	8 (7)	0	20.73	<0.001
Scale and polish	93 (20)	126 (27)	129 (28)	82 (19)	31 (7)	47.48	<0.001
Dental anxiety treatments							
Laughing gas (RA)	60 (26)	70 (31)	59 (26)	24 (11)	14 (6)	4.99	0.29
Injection in arm (IV sedation)	65 (26)	80 (32)	60 (24)	25 (10)	21 (8)	7.37	0.12

† df=4

5.4.73 Dental treatment experiences by category of homelessness

Significantly larger proportions of participants categorised as 'houseless' compared with 'roofless' and 'other homeless' reported that they had experience of fluoride treatment. No other significant differences were shown (Table 45).

Table 45: Dental treatment experiences by category of homelessness

	ROOFLESS n (%)	HOUSELESS n (%)	OTHER HOMELESS n (%)	X^2(df)†	P
Dental treatments					
Fillings	37 (5)	482 (64)	146 (19)	3.38	0.18
Extractions	35 (5)	451 (60)	119 (15)	3.68	0.15
Dentures	16 (2)	187 (24)	41 (5)	3.82	0.14
Preventive treatments					
Fluoride treatments	15 (2)	72 (10)	22 (3)	14.31	0.01
Fissure sealants	10 (1)	71 (10)	27 (4)	4.39	0.11
Scale and polish	28 (3)	324 (43)	81 (11)	4.28	0.12
Dental anxiety treatments					
Laughing gas (RA)	18 (2)	153 (20)	45 (6)	3.01	0.22
Injection in arm (IV sedation)	19 (3)	164 (22)	55 (7)	3.49	0.17

† df=2

5.4.8 Attitudes to accessing dental treatment

Seventy-nine percent (632) of the sample population stated that they would like to drop-in without an appointment for dental treatment. Sixty-one percent (490) stated

that they wanted to know more about the dental treatment they were to receive. Over half of the sample (59%) stated that they would prefer to take painkillers than attend for dental treatment, 57% felt that the worst part of dental treatment was waiting and 48% (409) found NHS dental treatment difficult to find. Smaller proportions of the sample felt that they did not want intricate dental treatment (36%), felt that they were on a conveyor belt (33%) and felt that receptionists were not welcoming (28%).

Principal components factor analysis was used to assist with the interpretation of the nine dental access attitudinal items so as to form consistent and reliable scales. This produced two scales, which were found to explain 41.50% of the variance.

1. Scale 1 explained 21.15% of the variance (items 1-6, eigenvalue=2.65).
2. Scale 2 explained a further 20.35% of the variance (items 7-9, eigenvalue=1.07).

These scales described different attitudinal aspects providing insight into the inhibitions and anxiety related factors which provide the basis for barriers which hinder access to dental treatment for this group of homeless people. Scale 1 was, therefore, conceptualised as 'access inhibition'; Scale 2 was conceptualised as 'access anxiety'. Both scales had a Cronbach's alpha of 0.60 which suggests that these are reliable scales and suitable for group comparisons (Table 46).

Table 46: Dental treatment access attitudinal scales and attitude items

Attitudinal Item		Cronbach's alpha	Factor loading	Mean (95%CI)
	Scale 1: access inhibition	**0.6**		**14.65 (14.35, 14.94)**
AI 1	I'd like to know more about what the dentist is going to do and why		0.70	2.68 (2.59, 2.77)
AI 2	Dental receptionists not very helpful or welcoming		0.62	1.84 (1.76, 1.92)
AI 3	I find NHS treatment difficult to find		0.52	2.51 (2.42, 2.61)
AI 4	Going to the dentist is like being processed on a conveyer belt		0.50	2.02 (1.94, 2.10)
AI 5	I'd like to be able to drop in at the dentist without an appointment		0.48	3.26 (3.18, 3.34)
AI 6	I don't want intricate dental treatment		0.39	2.34 (2.25, 2.43)
	Scale 2: access anxiety	**0.6**		**7.06 (6.86,7.25)**
AA 1	If I had toothache I'd rather take painkillers than go to the dentist		0.78	2.65 (2.56, 2.74)
AA 2	The worst part of going to the dentist is waiting for treatment		0.76	2.52 (2.43, 2.61)
AA 3	I don't like lying flat in the dental chair		0.49	1.89 (1.80, 1.97)

5.4.81 Dental treatment access attitudes and scales: comparisons by gender

Woman had significantly greater mean scores for the access inhibition and for access anxiety attitudinal scales compared with the men (Table 47).

Table 47: Dental treatment access attitudinal scales: comparisons by gender

MEAN ACCESS ATTITUDE SCORES	GENDER		F (df)	P
	Male [mean: (SD)]	Female [mean: (SD)]		
'Inhibition' scale items	14.41 (3.98)	15.18 (4.43)	5.17(1)	0.03
'Anxiety' scale items	6.90 (2.67)	7.57 (2.69)	9.605 (1)	0.002

Women compared with the men had significantly greater mean scores for the individual attitudes: 'dental receptionists are not helpful' (A12), 'feel like they are on a conveyor belt' (A14), 'taking painkillers rather than going to the dentist' (AA1) and 'dislike lying flat' (AA3) (Table 48).

Table 48: Dental treatment access attitudes: comparisons by gender

ACCESS ATTITUDINAL SCALE ITEMS	GENDER		t	P
	Male [mean: (SD)]	Female [mean: (SD)]		
AI 2	1.79 (1.07)	2.00 (1.14)	2.39	0.02
AI 4	1.92 (1.10)	2.33 (1.22)	4.27	<0.001
AA 1	2.62 (1.26)	2.83 (1.28)	2.08	0.04
AA 3	1.81 (1.15)	2.10 (1.29)	2.89	0.004

5.4.82 Dental treatment access attitudinal scales: comparisons by age group

The grouping variable 'age group' explained differences in mean scores for access inhibition and access anxiety scores. Younger participants had significantly greater mean scores for the individual items 'feel like they are on a conveyor belt' ($F[4]=4.23$, $P=0.002$) 'taking painkillers rather than going to the dentist' ($F[4]=5.30, P<0.001$) (see Appendix 9.6 for comparison of all individual items). Participants in older age groups

had lower mean scores for access anxiety compared with younger age groups (Table 49).

Table 49: Dental treatment access attitudes: comparisons by age group

MEAN ACCESS ATTITUDE SCORES	16-24 YRS MEAN (SD)	25-34 YRS MEAN (SD)	35-44 YRS MEAN (SD)	45-54 YRS MEAN (SD)	55 YEARS + MEAN (SD)	F (df)	P
'Inhibition' scale items	14 78 (4.51)	14.77 (3.69)	14.50 (4.23)	14.09 (3.96)	14.90 (3.99)	0.66 (4, 747)	0.61
'Anxiety' scale items	7.35 (2.72)	7.30 (2.66)	6.83 (2.64)	6.83 (2.65)	6.45 (2.86)	2.31 (4, 747)	0.56

5.4.83 Dental treatment access attitudinal scales: comparisons by category of homelessness

The grouping category of homelessness did not explain differences in mean score for either the access inhibition scale responses or access anxiety scale responses (Appendix 9.7 for comparison of all individual items by category of homelessness).

Table 50: Dental treatment access attitudes: comparisons by category of homelessness

MEAN ACCESS ATTITUDE SCORES	ROOFLESS MEAN (95%CL)	HOUSELESS MEAN (95%CL)	OTHER MEAN (95%CL)	F (df)	P
'Inhibition' scale items	15.76 (14.34, 17.19)	14.51 (14.16, 14.85)	14.94 (14.26, 15.59)	2.15 (2, 708)	0.12
'Anxiety' scale items	7.40 (6.55, 8.25)	7.06 (6.83, 7.29)	7.09 (6.68, 7.50)	0.31 (2, 738)	0.73

5.5 Psycho-social health

5.5.1 Dental anxiety

The mean modified dental anxiety scale (MDAS) score for the sample was 11.7 [95% CI: 11.21, 12.25]. Twenty percent (170) of participants scored 19 or over, suggesting that one-fifth of the sample were categorised as dentally phobic. Larger proportions of participants reported that they were extremely anxious about having their teeth drilled (24%) and having a local anaesthetic (22%). The least feared item was a scale and polish with only 11% scoring 5.

5.5.12 Dental anxiety: comparison of mean MDAS scores by gender

Women (14.42 [6.86]) compared with men (11.26 [6.29]) had significantly higher mean scores for dental anxiety (t=5.85:P<0.001). Seventeen percent of men (101) and 32% (69) of women scored 19. Women had significantly higher mean scores for anxiety associated with 'treatment tomorrow' (t=4.84:P<0.001), 'waiting room' (t=5.45:P<0.001), 'teeth drilled' (t=5.53:P<0.001), 'teeth scaled and polished (t=4.08:P<0.001) and local anaesthetic injection than men (t=5.97:P<0.001).

5.5.13 Dental anxiety: comparison of mean MDAS scores by age group

The grouping variable 'age group' significantly explained differences in mean total MDAS scores (F[4,778]=6.49:P<0.001). Participants aged between 45-54 years and from 55 years and older had significantly lower mean scores for dental anxiety compared with those aged between 25 and 34 years. The grouping variable age group significantly explained differences in the individual mean MDAS item scores. Participants aged between 45-54 years and from 55 years and older had significantly lower mean scores for dental anxiety compared with those in younger age groups (Table 51).

Table 51: Comparison of mean MDAS scores by age group

Modified dental anxiety scale		Mean	95% CIs		F(df)	p
MDAS 1 treatment tomorrow	16 and 24	2.33[1,2†]	2.13	2.53	4.86 (4,802)	0.001
	25 and 34	2.58[2]	2.38	2.77		
	35 and 44	2.19[1,2]	1.98	2.39		
	45 and 54	1.96[1]	1.73	2.20		
	55 and over	1.95[1]	1.63	2.26		
MDAS 2 in waiting room	16 and 24	2.42	2.22	2.61	2.86 (4,796)	0.02
	25 and 34	2.56	2.37	2.75		
	35 and 44	2.22	2.01	2.43		
	45 and 54	2.18	1.93	2.43		
	55 and over	2.02	1.69	2.35		
MDAS 3 teeth drilled	16 and 24	3.05[2]	2.84	3.26	8.98 (4,794)	<0.001
	25 and 34	3.17[2]	2.97	3.37		
	35 and 44	2.56[1,2]	2.33	2.79		
	45 and 54	2.38[1]	2.10	2.66		
	55 and over	2.34[1]	1.93	2.75		
MDAS 4 scale & polish	16 and 24	2.01[2]	1.83	2.20	4.43 (4,795)	0.001
	25 and 34	2.32[2]	2.13	2.51		
	35 and 44	1.93[1,2]	1.74	2.12		
	45 and 54	1.75[1]	1.53	1.98		
	55 and over	1.79[1]	1.44	2.13		
MDAS 5 injection in gum	16 and 24	2.90[2]	2.68	3.11	6.45 (4,796)	<0.001
	25 and 34	2.85[2]	2.64	3.06		
	35 and 44	2.47[1,2]	2.25	2.69		
	45 and 54	2.20[1]	1.93	2.47		
	55 and over	2.20[1]	1.81	2.59		
Total MDAS score	16 and 24	12.69[1,2]	11.81	13.58	6.49 (4,778)	<0.001
	25 and 34	13.47[2]	12.59	14.35		
	35 and 44	11.28[1,2]	10.32	12.25		
	45 and 54	10.41[1]	9.27	11.54		
	55 and over	10.32[1]	8.68	11.97		

[†]The suffixes show the significant differences in mean plaque scores which existed between the participants' category of homelessness grouping.

5.5.14 Dental anxiety: comparison of mean MDAS scores by category of homelessness

The grouping variable category of homelessness did not explain significant differences in mean total or individual item MDAS scores (Table 52).

Table 52: Comparison of mean MDAS scores by category of homelessness

Modified dental anxiety scale		Mean	95% CIs		F(df)	p
			Lower Bound	Upper Bound		
MDAS 1 treatment tomorrow	roofless	2.49	1.99	2.98	1.12 (2,763)	0.32
	houseless	2.28	2.16	2.40		
	other homeless	2.15	1.94	2.35		
MDAS 2 in waiting room	roofless	2.42	1.92	2.91	1.16 (2,756)	0.31
	houseless	2.36	2.25	2.48		
	other homeless	2.18	1.97	2.39		
MDAS 3 teeth drilled	roofless	2.84	2.33	3.35	0.14 (2, 753)	0.86
	houseless	2.81	2.68	2.95		
	other homeless	2.89	2.66	3.12		
MDAS 4 scale & polish	roofless	2.05	1.63	2.46	1.72 (2,756)	0.17
	houseless	2.06	1.95	2.18		
	other homeless	1.84	1.65	2.03		
MDAS 5 injection in gum	roofless	2.77	2.25	3.29	0.18 (2,756)	0.83
	houseless	2.65	2.52	2.79		
	other homeless	2.61	2.38	2.84		
Total MDAS score	roofless	12.5	10.26	14.75	0.79 (2,756)	0.56
	houseless	12.18	11.61	12.74		
	other homeless	11.59	10.65	12.53		

5.5.2 Oral health-related quality of life (OHIP-14)

The mean OHIP-14 total score was 1.22 [95%CI: 1.14,1.29]. Figure 11 and Table 53 show the frequency of oral health impacts experienced by this sample of homeless people in the last 12 months. Twenty-five percent of the sample reported feeling self-conscious very often, and 23% reported feeling embarrassed very often about the appearance of their mouth and teeth. In addition, 13% stated that very often they found their lives less satisfying because of problems with their mouth and teeth. As expected, many respondents occasionally experienced painful aching (31%), discomfort when eating (28%), and interruptions during meals (21%).

For this population of homeless people, oral health impacted upon their psychological functioning with regard to psychological discomfort and disability. In comparison with the Scottish sample from the Adult Dental Health Survey 1998 [135], larger proportions of participants in the homeless sample experienced greater numbers of impacts compared with the UK population.

Figure11: Percentage of total sample experiencing oral health impacts

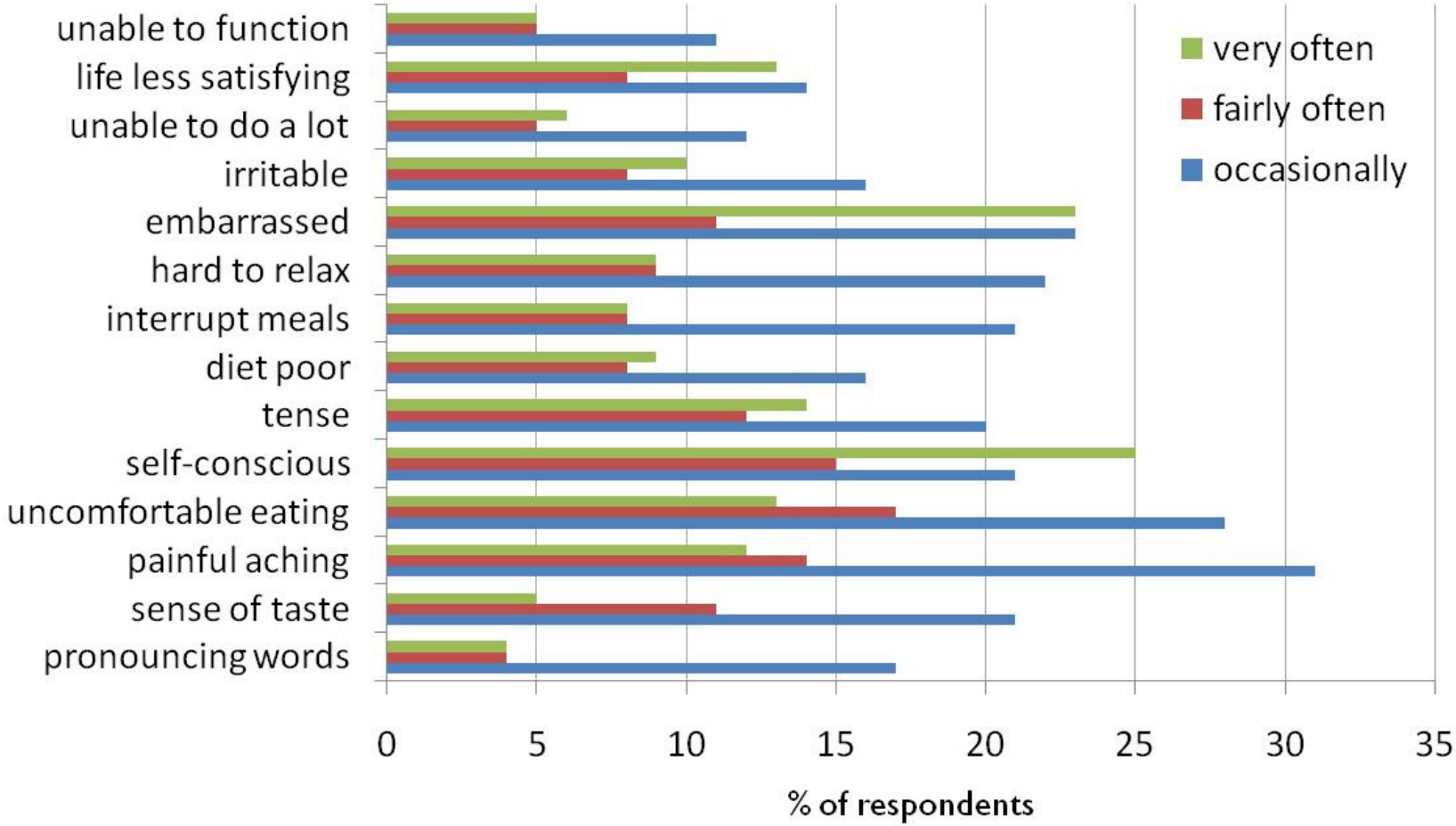


Table 53: Frequency of oral health impact in the preceding 12 months; comparisons with ADHS (SCOTLAND 1998)

ORAL HEALTH IMPACT	FREQUENCY OF IMPACT					
	Occasionally		Fairly often		Very often	
	OHS[2]	ADHS[3]	**OHS**	ADHS	**OHS**	ADHS
Functional limitation						
Prounouncing words	**17%**	3%	**4%**	1%	**4%**	0%
Sense of taste worsened	**21%**	6%	**11%**	1%	**5%**	1%
Physical pain						
Painful aching mouth	**31%**	22%	**17%**	4%	**12%**	2%
Uncomfortable to eat	**29%**	23%	**17%**	4%	**13%**	2%
Psychological discomfort						
Felt self-conscious	**21%**	15%	**15%**	4%	**25%**	4%
Felt tense	**20%**	10%	**12%**	1%	**14%**	1%
Physical disability						
Had an unsatisfactory diet	**16%**	3%	**7%**	0%	**9%**	0%
Had to interrupt meals	**21%**	6%	**8%**	0%	**8%**	0%
Psychological disability						
Difficult to relax	**22%**	8%	**9%**	1%	**9%**	1%
Felt embarrassed	**23%**	10%	**11%**	2%	**23%**	2%
Social disability						
Irritable with other people	**16%**	6%	**8%**	1%	**10%**	0%
Difficulty in doing usual jobs	**12%**	2%	**5%**	0%	**6%**	0%
Handicap						
Life less satisfying	**14%**	5%	**8%**	1%	**13%**	1%
Unable to function	**11%**	1%	**5%**	0%	**5%**	0%

[2] OHS: Smile4life: the Scottish Homeless Persons' Oral Health Survey (2009)
[3] ADHS: the Adult Dental Health Survey for the UK (1998)

5.5.21 Oral health-related quality of life: comparison by gender

Female participants (1.38 [1.12]) had significantly greater mean scores for oral health related quality of scores compared with male participants (1.06 [0.98]) (t=2.39: P=0.02).

5.5.22 Oral health-related quality of life: comparison by age group

Mean oral health related quality of scores was explained by the grouping variable age group. Those participants aged between 16 and 24 years and those 55 years and older had significantly fewer oral health impacts compared with those aged between 25 and 35 years of age (Table 54). This means that oral health impacted particularly upon those aged between 25 and 34 years of age compared with the other age groups.

Table 54: Oral health-related quality of life: comparison by age group

Age group	Mean OHIP score	95% CI	F[df]	P
16-24	0.94[1]	0.82, 1.07	11.21 [4, 713]	<0.001
25-34	1.48[3]	1.33, 1.64		
35-44	1.41[2,3]	1.24, 1.57		
45-54	1.05[1,2]	0.87, 1.24		
55+	0.86[1]	0.62, 1.11		

*The suffixes show the significant differences in mean OHIP scores which exist between age groups

5.5.23 Oral health-related quality of life: comparison by category of homelessness

The grouping variable category of homelessness did not explain differences in total mean OHIP scales (F[2,679]=1.78:P=0.12). However, people who were categorised as 'roofless' had significantly higher mean scores compared with those categorised as 'houseless' and 'other homeless' for 'difficulty in pronouncing words', 'difficulty in relaxing', 'life less satisfying' and 'being unable to function'. Differences in mean oral health impact scores were noted between those participants categorised as 'roofless' compared with the 'other homeless' for 'sense of smell' (P=0.06) and 'difficulties during the usual jobs' (P=0.07) (Table 55).

Table 55: Oral health-related quality of life: comparisons of mean scores by category of homelessness

ORAL HEALTH IMPACT		Mean	95% Confidence Intervals Lower	Upper	F (df)	p
OHIP 1 pronouncing words	roofless	1.05[2]	0.63	1.47	3.85 (2,753)	0.02
	houseless	0.79 [1,2]	0.70	0.89		
	other	0.57[1]	0.41	0.72		
OHIP 2 sense of taste	roofless	1.42[2]	0.99	1.85	2.72 (2,751)	0.06
	houseless	1.02[1,2]	0.91	1.13		
	other	0.91[1,]	0.74	1.09		
OHIP 3 painful aching	roofless	1.79	1.32	2.25	0.05 (2,747)	0.94
	houseless	1.73	1.62	1.85		
	other	1.76	1.57	1.95		
OHIP 4 uncomfortable to eat	roofless	2.10	1.62	2.57	1.88 (2,749)	0.15
	houseless	1.73	1.61	1.85		
	other	1.63	1.44	1.82		
OHIP 5 self-conscious	roofless	1.95	1.46	2.44	0.42 (2,744)	0.65
	houseless	1.95	1.81	2.08		
	other	1.82	1.57	2.06		
OHIP 6 Tense	roofless	1.71	1.23	2.19	0.75 (2,749)	0.46
	houseless	1.41	1.29	1.54		
	other	1.42	1.19	1.65		
OHIP 7 diet unsatisfactory	roofless	1.12	0.69	1.55	0.19 (2,748)	0.82
	houseless	1.01	0.90	1.13		
	other	0.97	0.77	1.18		
OHIP 8 interrupt meals	roofless	1.28	0.87	1.69	0.83 (2,751)	0.43
	houseless	1.13	1.01	1.24		
	other	1.01	0.82	1.20		
	Total	1.11	1.02	1.21		
OHIP 9 difficult to relax	roofless	1.91[,2]	1.43	2.39	6.15 (2,747)	0.002
	houseless	1.17[1]	1.05	1.28		
	other	1.16[1]	0.97	1.36		
OHIP 10 embarrassed	roofless	2.07	1.57	2.57	0.78 (2,749)	0.45
	houseless	1.82	1.68	1.95		
	other	1.73	1.50	1.96		
OHIP 11 irritable	roofless	1.53	1.06	2.01	2.16 (2,744)	0.11
	houseless	1.08	0.96	1.20		
	other	1.09	0.89	1.30		
OHIP 12 difficulties doing usual jobs	roofless	1.14[2]	0.66	1.62	2.64 (2,749)	0.07
	houseless	0.74[1,2]	0.64	0.84		
	other	0.67[1,]	0.51	0.83		
OHIP 13 life less satisfying	roofless	1.70[2]	1.22	2.18	4.20 (2,748)	0.01
	houseless	1.12[1]	0.99	1.24		
	other	0.99[1]	0.78	1.19		
OHIP 14 unable to function	roofless	1.14[,2]	0.71	1.57	4.96 (2,750)	0.007
	houseless	0.61[1,2]	0.52	0.71		
	other	0.56[1]	0.41	0.71		

*The suffixes show the significant differences in mean OHIP scores which exist between category of homeless groups.

5.5.3 Depression

Two percent of men and 2.5% of women in the UK are said to suffer from depression. In this homeless population, 58% percent of respondents who completed the Centre for Epidemiological Studies Depression Scale (CES-D) scored at least 16, which suggested that they were suffering from a depressive illness. The mean score for depression was 21.71 [95% CI: 20.60, 22.83].

5.5.31 Depression: comparisons by gender

Female participants (24.81 [13.76]) compared with male participants (20.54 [13.80]) had significantly higher mean scores for depression (t=3.25: P=0.001) (Table 56). Women compared with men had significantly higher mean scores for the individual depression (CES-D) scale items: having a poor appetite (t=3.18: P=0.002), feeling that life was a failure (t=3.37: P=0.001), feeling fearful (t=2.66: P=0.008), talking less (t=2.43: P=0.02), having crying spells (t=7.78:P<0.001), feeling sad (t=4.14:P<0.001) and feeling that people dislike them (t=2.29:P=0.02).

Table 56: Depression: comparisons of mean scores by gender

MEAN CES-D SCORE	MALE MEAN (95%CI)	FEMALE MEAN (95%CI)	F (df)	P
Mean total CES-D scores	20.54 (19.20, 21.88)	20.81 (22.59, 27.03)	10.54 (1, 561)	<0.001
Mean CES-DHAPPY[1] scores	6.19 (5.84, 6.44)	6.80 (6.28, 7.31)	3.21 (1, 625)	0.07
Mean CES-DSAD[2] scores	14.14 (12.92, 15.35)	18.00 (15.95, 20.05)	10.34 (1, 580)	<0.001

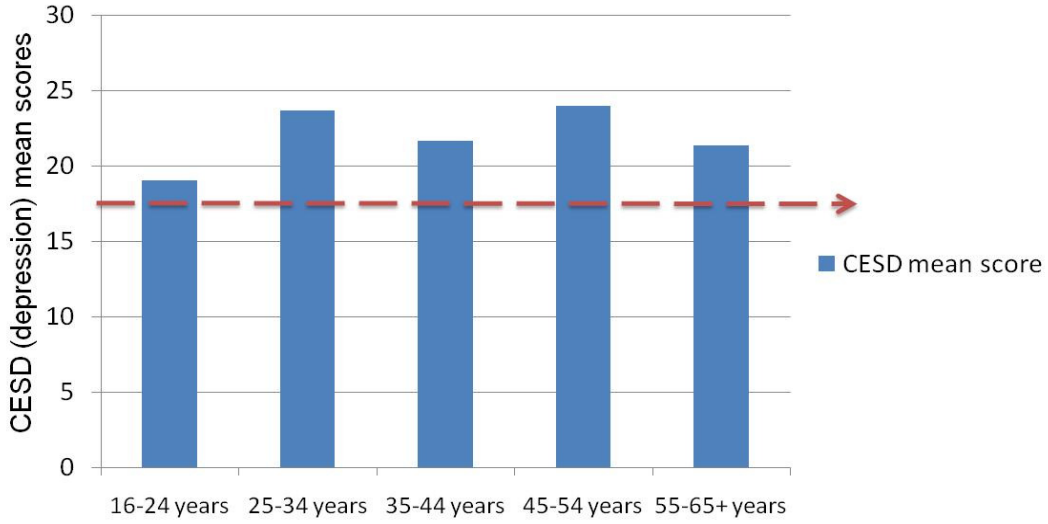
[1] The mean CES-DHAPPY scores were derived from a scale which condensed the individual 'happy' (positive) items from the full CES-D scale: 'I felt I was just as good as other people', I felt hopeful about the future', 'I was happy', 'I enjoyed life'.

[2] The mean CES-DSAD scores were derived from a scale which condensed the individual 'sad' (negative) items from the full CES-D scale: 'I was bothered by things that usually don't bother me', 'I did not feel like eating; my appetite was poor', 'I felt I could not shake off the blues even with help from my family or friends', 'I had trouble keeping my mind on what I was doing', 'I felt depressed', 'I felt that everything was an effort', 'I thought my life had been a failure', 'I felt fearful', 'My sleep was restless', 'I talked less than usual', ' I felt lonely', 'People were unfriendly', ' I had crying spells', 'I felt sad', 'I felt that people dislike me', 'I could not get "going"'.

5.5.32 Depression: comparison by age group

Mean depression scores were highest in the 25-34 (23.76) and 45-54 (23.83) age groups. Significant differences in mean depression scores were explained by the grouping variable age group (F [4,543]=2.77: P=0.03). Therefore, participants aged between 16-24 years had significantly lower mean scores compared with other age groups (Figure 12).

Figure 12: Comparison of mean depression scores by age group



5.5.33 Depression: comparisons by category of homelessness

The grouping variable category of homelessness significantly explained the differences in CES-D total mean scores and CES-DSAD mean scores. Rough sleepers had significantly higher mean scores for total CES-D compared with 'houseless' and other categories of homelessness. 'Roofless' people had significantly higher mean scores for CES-DSAD than those categorised as 'houseless' or 'other homeless' (Table 57). No other significant differences in mean scores were shown.

Table 57: Comparison of depression mean scores by category of homelessness

MEAN CES-D SCORE	ROOFLESS MEAN (95%CL)	HOUSELESS MEAN (95%CL)	OTHER HOMELESS MEAN (95%CL)	F (df)	P
Mean total CES-D scores	29.04[2] (21.52, 36.57)	22.33[1] (20.96, 23.71)	17.67[1] (15.51, 19.83)	8.39 (2,547)	<0.001
Mean CES-DHAPPY[1] scores	6.70 (5.20, 8.21)	6.28 (5.94, 6.63)	6.41 (5.76, 7.07)	0.27 (2,547)	0.59
Mean CES-DSAD[2] scores	22,27[2] (15.66, 28.87)	15.88[2] (14.62, 17.14)	11.19[1] (9.27, 13.12)	9.93 (2,547)	<0.001

*The suffixes show the significant differences in mean CES-D scores which exist between category of homeless groups

[1] The mean CES-DHAPPY scores were derived from a scale which condensed the individual 'happy' (positive) items from the full CES-D scale: 'I felt I was just as good as other people', I felt hopeful about the future', 'I was happy', 'I enjoyed life'.
[2] The mean CES-DSAD scores were derived from a scale which condensed the individual 'sad' (negative) items from the full CES-D scale: 'I was bothered by things that usually don't bother me', 'I did not feel like eating; my appetite was poor', 'I felt I could not shake off the blues even with help from my family or friends', 'I had trouble keeping my mind on what I was doing', 'I felt depressed', 'I felt that everything was an effort', 'I thought my life had been a failure', 'I felt fearful', 'My sleep was restless', 'I talked less than usual', ' I felt lonely', 'People were unfriendly', ' I had crying spells', 'I felt sad', 'I felt that people dislike me', 'I could not get "going"'.

5.5.4 Characterisation of psychosocial health for the 3 categories of homelessness: 'roofless', 'houseless' and 'other homeless'

A canonical discriminant analysis of the three categories of homelessness was conducted against the independent oral health which had been shown to distinguish between the groups. These were depression (total CES-D scores), OHIP item 1: difficulty in pronouncing words, OHIP item 9: difficult to relax, OHIP item 13: life less satisfying; OHIP item 14: unable to function.

The analysis showed that the three categories of homelessness could be discriminated by 2 canonical functions (Table 58), approximating to 2 dimensions of depressive states. Function 1 related to depression and oral health impact and accounted for 81% of the in group variance. Function 2 related to functional depression and accounted for 19% of the in between group variance (Table 59).

Table 58: Pooled within-groups correlations between discriminating variables and standardised canonical discriminant functions: Psycho-social health

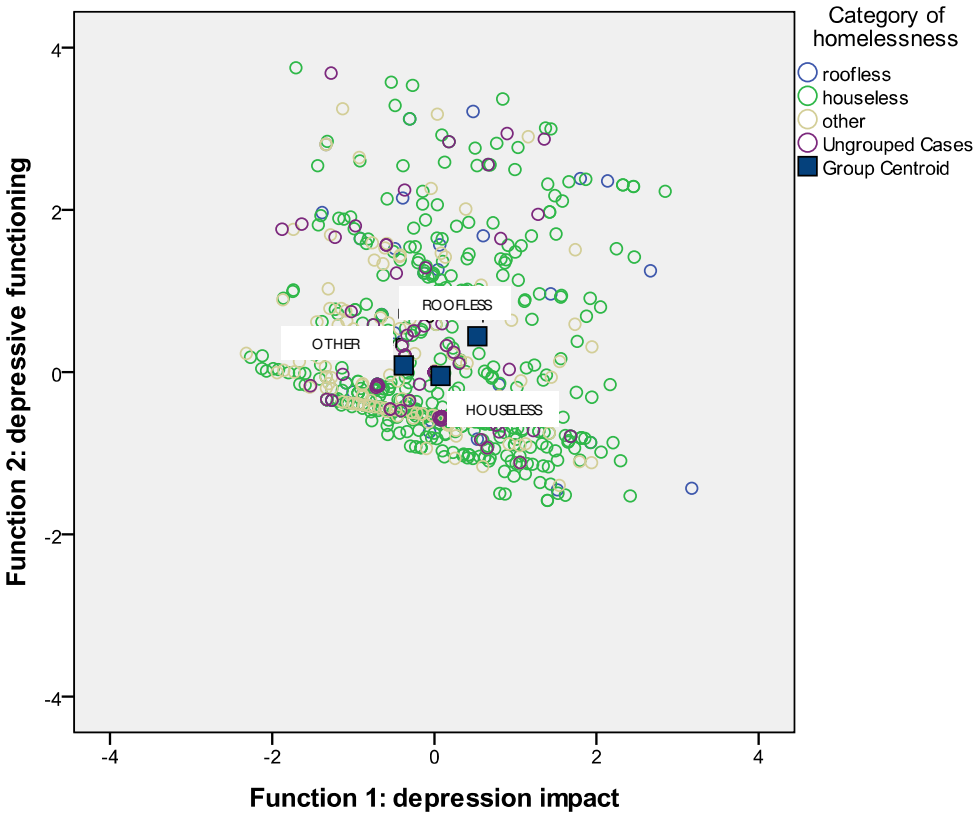
	Function 1	Function 2
Depression (Total CES-D) scores	**0.81**	0.24
OHIP item 1	**0.05**	0.14
OHIP item 14	0.28	**0.94**
OHIP item 9	0.08	**0.67**
OHIP item 13	0.26	**0.59**

Table 59: Eigenvalues for the 2 Canonical Discriminant Functions: Psycho-social health

Function	Eigenvalue	% of Variance	Canonical Correlation
1	0.05	81	0.21
2	0.01	19	0.10

People who were categorised as 'houseless' were characterised by Function 1. People categorised as rooflessness were characterised by both functions experiencing depression and associated reduced function. People who were categorised as 'other homeless', were characterised by Function 1 having reduced experience of depression and its impact (Figure 13).

Figure 13 Category of homelessness: canonical discriminant functions – psycho-social health



5.6 Categorising types of homelessness: oral health, health and psychosocial factors.

In order to identify oral health, health and psychosocial factors that are able to act as additional descriptors of the ETHOS typologies of homelessness a number of variables were calculated. Each of the variables that were shown to discriminate between 'houseless', 'roofless' and the category of 'other homeless' were constructed. All of the individual variables were converted into scales by multiplying the variable values by the weighted standardised canonical discriminant functions. All the weighted scales were added together to give a total score for health, health behaviours, oral health, dental health, depression impact and depressive functioning. The individual items, the mean scores and 95% CI together with the range of scores for each of the total scales is presented in Table 60.

A multi-nomial logistic regression analysis was conducted to determine the characterisation which defined the ETHOS categorisations of homelessness and the direction of that association. Three independent variables were used and were specified using an indicator coding scheme. These were, age, NHS Board of residence and family type. NHS Board of residence was categorised as mixed rural/urban=0 and urban=1. Age was recoded into 4 age groups (16-24 years=0; 25-34 years=1; 35-45 years =2 and 45 years and over =3) and family type was recoded as 4 subgroups (single=0; partner/no children=1; one parent family =2; two parent family =3). These demographic factors were entered into the analysis as fixed factors using the forced entry method.

Table 60 Discriminating variables between 'houseless', 'other homeless' and 'roofless' participants

Discriminating variables	Health Factor	Health behaviours	Oral health	Dental health	Depression impact	Depressive functioning
Mean scores (95%CI)	0.31 (0.27, 0.35)	1.08 (1.04, 1.13)	20.85 (15.98, 25.72)	11.62 (10.91, 12.33)	17.06 (16.01, 18.12)	1.92 (1.70, 2.15)
Range	0 to 1.25	0 to 1.95	0 to 258	0 to 30.80	0 to 46.17	0 to 8.80
Individual items of each new variable	Previous drug use	Injecting drug use	Lower plaque score	Obvious decay experience	CES-D scores	OHIP item 1
	Hypertension	Cigarette smoking	Total plaque score	Missing teeth		OHIP item 14
		Prescribed medicines	Upper plaque score			OHIP item 9
			Mucosal lesion			OHIP item 13
			Standing teeth			

The above additional new independent variables of oral health, dental health, health, health behaviours, depression impact and depressive functioning (Table 60) were entered as covariates using a backward stepwise procedure. All independent variables were regressed against the dependent variable categorisation of homelessness. The dependent variable was defined as 'houseless' (=0), 'other homeless' (=1) and 'roofless' (=2). 'Houseless' was used as the reference category.

5.6.1 Categorising 'other homeless' participants relative to 'houseless' participants

Participants residing in a mixed rural-urban NHS Board compared to those residing in an urban NHS Board the relative risk for being 'other homeless' relative to the reference category 'houseless' would be expected to increase by a factor of 5.87 given that all other factors in the model are kept constant. This means that participants residing in a mixed rural-urban NHS Board are significantly more likely than those residing in an urban NHS Board to be 'other homeless' than houseless. For those participants who were single relative to those who were in two-parent families the relative risk for being 'other homeless' relative to the reference category 'houseless' would be expected to decrease by a factor of 0.19 given that the other variables in the model are kept constant. For those participants who were in a partnership relative to those who were in two-parent families the relative risk for being 'other homeless' relative to the reference category 'houseless' would be expected to decrease by a factor of 0.08 given that the other variables in the model are kept constant. This means that participants who were single or in a partnership with no children were significantly less likely than two-parent families to be categorised as 'houseless' (Table 61).

For one unit increase in health score, the relative risk of being 'houseless' relative to 'other homeless' would be 0.31 times more likely when the other variables in the model are held constant. In other words if 'other homeless' participants were to increase their

health scores, they would significantly be more likely to be in the 'houseless' group rather than the 'other homeless' group. Similarly for one unit increase in depression impact score, the relative risk of being 'houseless' over 'other homeless' would be 0.97 times more likely when the other variables in the model are held constant. This means that if 'other homeless' group members were to increase their depression impact scores they would significantly be more likely to be in the 'houseless' group than the 'other homeless' group. No other significant effects were shown (Table 61).

5.6.2 Categorising 'roofless' participants relative to 'houseless' participants

For one unit increase in depression impact score, the relative risk of being 'roofless' over 'houseless' would be 1.61 times more likely when the other variables in the model are held constant. This means that if 'roofless' group members were to increase their depression impact scores they would significantly be more likely to be in the 'roofless' group than the 'houseless' group. No other significant effects were shown (Table 61).

Table 61: Characterisation of 'houseless', 'other homeless' and 'roofless' participants by oral health, health and psychosocial factors

⧈Other homeless	Odds ratio Exp (B)	95%CI	P
⌖NHS Board	5.87	2.68, 12.81	<0.001
¥Family type			
single	0.12	0.04, 0.32	<0.001
with partner	0.08	0.02, 0.26	<0.001
single parent	0.28	0.06, 1.36	0.11
▣Age group			
16-24 years	0.92	0.38, 2.27	0.86
25-34 years	1.09	0.42, 2.82	0.87
35-44 years	0.85	0.30, 2.39	0.76
Total health scale	0.31	0.13, 0.73	0.008
Total depression impact	0.97	0.94,0.98	0.03
Roofless	**Odds ratio Exp (B)**	**95%CI**	**P**
NHS Board	2.91	0.73, 11.60	0.13
Family type			
single	0.16	0.02, 1.61	0.12
with partner	0.16	0.01, 3.00	0.22
single parent	0.40	0.02, 8.48	0.56
Age group			
16-24 years	0.45	0.06, 3.23	0.43
25-34 years	0.81	0.12, 5.54	0.83
35-44 years	1.89	0.35, 10.25	0.46
Total health scale	1.61	0.35, 7.46	0.54
Total depression impact	1.05	1.00, 1.12	0.03

⧈ Characterisation of homelessness: reference group: 'Houseless' =0

⌖ NHS Board: reference group: urban=1

¥ Family type: reference group: two parent family=3

▣ Age group: reference group: 45 and over years=3

In summary Table 62 shows the characterisation of homeless people who took part in this survey.

Table 62: Characterisation of homeless people against a framework of typology

ADDITIONAL DESCRIPTORS	ETHOS TYPOLOGY		
	HOUSELESS	OTHER HOMELESS	ROOFLESS
Demography	Older age groups Female 2 or 1 parent family Urban NHS Board	Younger age groups Male Single With partner Mixed rural-urban NHS Board	Single With partner Older age groups Male or female Mixed rural or urban NHS Board
Oral health	Higher levels of plaque, mucosal lesions. Fewer natural teeth Fluoride treatments	Lower levels of plaque and mucosal lesions. Greater numbers of retained natural teeth	Greater numbers of missing teeth Greater obvious decay experience Higher levels of plaque, mucosal lesions. Fewer standing teeth
Health and health behaviours	Greater health impact Some previous and current drug use Some tobacco smoked Prescribed medication	Less health impact Previous drug use Tobacco smoked	Greater health impact Injecting drug use Alcohol taken Tobacco smoked Some prescribed medication
Psycho-social wellbeing	Total depression impact	Lower oral health impacts on OHRQoL Lower depression impact	Higher oral health impacts on functioning Total depression impact

6.0 Discussion

6.1 Introduction

In the sphere of research within the context of homeless populations there has been much focus on improving the understanding of the causes and effects of homelessness, preventing homelessness and developing a knowledge base with regard to health of homeless individuals. This has resulted in an extensive awareness of the homeless community and those individuals relevant to their lifestyle choices, pathways in and out of homelessness and the health of homeless individuals which is reflected in the availability of literature pertaining to these factors. There is in comparison, however, a relative paucity of literature available linking the oral health and health behaviours and other factors such as psycho-social wellbeing of homeless people. Consequently there is little literature which links homeless people's oral health, health and psycho-social wellbeing with a recognised typological categorisation of their homelessness status.

Nonetheless the literature does provide information which supports the view that it is the type of homelessness experienced which affects health in its widest context. Therefore, it is the quality of the homelessness experience which results in increased oral health and health risk and this risk is based on homelessness-related factors. In other words there is the need to develop a health-related typology of homelessness to reflect the heterogeneity of those who are homeless. In order to capture the heterogeneity of homelessness several frameworks of categorising homeless populations have been proposed and developed, whereby the various groups of homeless experiences have been drawn together in descriptive typological groups. Using the framework of the operational-based ETHOS typology, the work presented in this thesis seeks to characterise Scottish homeless people in terms of their oral health, health and psycho-social wellbeing, since, it seemed reasonable to propose that a greater understanding of the position of oral health, health and psycho-social wellbeing within the ETHOS typology might inform a tailored intervention [140] to

increase engagement with health services. Therefore the aim of the thesis was to investigate if oral health, health and psycho-social well-being could act as additional descriptors of the ETHOS typology of homelessness for a Scotland-wide population of homeless people in order to inform a tailored intervention to increase engagement with health services.

6.2 Homelessness in Scotland

There are growing numbers of homeless people in Scotland, particularly in urban areas. In 2004 it was estimated that there were at least 54,829 homeless people in Scotland, and that this figure was rising from year to year [141]. In 2011 the number of homeless people in Scotland was estimated to be 55,227 [34].

This survey involved 853 homeless participants throughout Scotland. This is a very large sample population when compared with other surveys which have sought to investigate oral health of homeless populations. One of the reasons that sample sizes in homeless population surveys tend to be small is that it can be extremely challenging to locate, recruit and gain consent from homeless people for the purposes of participating in health surveys. Access to homeless populations is acknowledged as being complicated due to the disparate, transient nature of homeless people and their lifestyles, which makes it difficult to track down locations where homeless people might congregate in numbers. Furthermore, homeless people are often reluctant to participate in surveys as many have a mistrust of authority, based on previous negative experiences. Additional challenges such as low literacy levels and other competing priorities make it very time-consuming to analyse any homeless population.

This survey was designed to overcome some of these obstacles. Seven NHS Health Boards across Scotland agreed to participate in this survey maximising the potential numbers of participants. The participants were recruited from a wide variety of

locations where homeless people were known to access services, using a snowball technique, whereby the same venue was visited several times over the duration of the project. This ensured that as many people who wished to take part were sampled.

6.3 Demographic profile: is this a representative sample?

This survey employed a non-probability convenience sampling technique to recruit participants. This technique and method of recruitment while appropriate for accessing socially excluded groups, has recognised shortcomings such as the sample is not a randomised sample. Therefore it may not be representative since there may be groups of homeless people who were not included. Therefore does this sample of 853 participants constitute a representative group of those experiencing homelessness across Scotland? One way of answering this question is to examine the demographic profile of the sample and compare this sample's demography with others within the literature.

As mentioned above this survey comprised of 853 homeless participants, throughout Scotland. The majority of participants were male (74%), which is in keeping with the composition of the Scottish homeless population as a whole, and also other similar surveys [11, 70]. Moreover adult homeless populations, particularly adult single homeless populations, tend to be comprised of a higher number of males than females [3, 70, 141].

The age range of the participants in the survey was 16 to 78 years, with the majority of the participants (53%) being younger than 35-years-old. This finding is similar to other surveys of homeless populations where the majority of participants were found to be younger [11]. In contrast, the general population of Scotland is aging, with people living longer than in previous generations [142], partly due to improvements in healthcare. This improvement in life expectancy phenomenon does not seem to extend

to the homeless population [143], thus suggesting that the participants in the sample were distinct from those in the wider Scottish population.

The older participants in the sample were more likely to be male, than female. This contrasts, again, with the demographic profile of the settled Scottish population where females tend to live longer than males [142]. It is reasonable to speculate that this dissimilarity is perhaps a result of the heterogeneity of homelessness, in which women who experience homelessness constitute a different subpopulation. The findings from the multinomial regression analysis would support this conjecture since women compared with men were significantly more likely to be categorised as 'houseless' whereas as male participants were categorised as residing in insecure or inadequate housing. It is possible that housing policy ensures that women with or without families will be provided with more secure housing, as they age, being re-categorised in terms of priority need for housing.

The overwhelming majority of the participants in this survey described themselves as being 'single'. The remainder of the participants were either in a relationship with children, not in a relationship but living with their children, or had children with whom they were not living. When the age of the participants was compared with relationship status, it was found that significantly larger proportions of the oldest participants were single. In contrast the youngest age group of participants stated that they were in a relationship. This finding with regard to relationship status reflects the Scottish Statistics with regard to applications for housing in 2008-2009 [141].

The vast majority (91%) of the participants stated they were Caucasian. Small minorities stated that they were African/Caribbean, asylum seekers or Gypsy/Travellers, Asian or Chinese. When compared with the composition of the settled population of the U.K./Scotland, ethnic groups other than Caucasians were under-represented in this homeless population, however, when compared with the Operation

of the Homeless Persons Legislation in Scotland: 2010-11 [34], 93% of respondents stated they were Caucasian (White) with between 1% to 2% stating they were African/Caribbean or Asian. This suggested that the ethnic profile of this sample of homeless people reflected that for Scotland as a whole.

Moreover, this ethnic imbalance has been demonstrated in other surveys of homeless populations, where, a minority of the participants are from ethnic groups [95]. This is quite distinct from surveys of homelessness in American inner-city areas where minority ethnic groups are over-represented [3]. It may be suggested that those who comprise homeless populations reflect the ethnic-related social disparities within the general population of the specific country in which the survey took place. Therefore it may be proposed that the sample of homeless people who took part in this survey are representative with regards to ethnicity of those experiencing homelessness in Scotland.

However, there is an alternative explanation. It is possible that the survey was not able to access people from ethnic minority groups who were experiencing insecure and inadequate housing and so could be described as the 'hidden homeless'. It may be the case that in Scotland, levels of homelessness in certain ethnic groups are concealed (hidden homelessness), with the nature of some people's living arrangements camouflaging the real extent of homelessness within that ethnic group. This suggestion is supported by a study in Northern Ireland conducted within the Chinese population of Belfast. Yuan and Freeman [144] found that many families were living within single overcrowded dwellings which being unfit accommodation would be classified as inadequate housing [34]. These families were not accessing services for homeless families, nor were they applying for housing, so would not be counted in any statistics enumerating the levels of homelessness in that area.

Fifty-five percent of the participants answered the question regarding occupation. Of the 468 participants who did reply to the question a quarter was skilled tradesmen with a further fifth being in unskilled occupations. Smaller percentages of the sample had been white collar workers which included professional occupations, associate professional occupations, secretarial work and so forth. The responses to this question highlighted the heterogeneity of this sample of homeless people reflecting national statistics [8].

The fact that many of the homeless people surveyed here reported having held unskilled or tradesman types of employment is probably not co-incidental. It is likely that the scope of employment available for these people was limited in the first instance by a lack of education, which leads to a lack of opportunities. The low levels of employment reported in this survey may be a reflection of the dearth of options available to homeless people before, during and after their experience of homelessness. However, only 18% of the sample stated that they had been economically inactive and unemployed. A variety of factors may have contributed to this low response rate, including issues relating to a suspicion of authority, concealment of current employment, combined with the erroneous assumption of collusion or information sharing amongst various authorities.

Using the ETHOS typology participants who were, for example living rough or accessing night shelters were categorised as ‘roofless’; hostel residents, those in long or short stay accommodation or supported accommodation and so forth were categorised as ‘houseless’ and those living in inadequate (e.g. squatting) or insecure (e.g. sofa surfing) were classified as ‘other homeless’. This method of grouping the living arrangements together using the ETHOS typology allowed the demographic data to be interpreted in such a way to assist in further characterising those experiencing rooflessness, houselessness and other homelessness.

A careful examination of the demographic profile of the sample therefore provided additional descriptors for the ETHOS classification [8]. The multi-nomial logistic regression analysis demonstrated that demographic factors could act as descriptors for rooflessness, houselessness and other homelessness. For instance, those who were categorised as 'roofless' compared with those categorised as 'houseless', they were more likely to be single or be in a relationship. For those participants who were categorised as 'other homeless' in relation to those categorised as 'houseless' they were more likely to be younger, to be male, to be single and to reside in a rural/rural-urban NHS Board. Therefore people experiencing houselessness were older, female, with partner, with/without children and living within an urban NHS Board.

In 2008-2009, the year in which the survey was undertaken, the applications for housing in Scotland reflected the demographic profile of those who participated in the survey [141]. In view of the supporting evidence regarding the demography of populations of homeless people and the Scotland-wide statistics it would seem reasonable to suggest that this sample of 853 participants is representative of those experiencing homelessness.

6.4 ***Health status and health behaviours***

It is widely acknowledged that homeless people tend to have high levels of ill-health [2]. Furthermore, homeless people have been reported as being unable to make informed choices in terms of their health behaviours , resulting in the tendency for risky behaviours which culminate in ill-health [65, 145-147].

Consequently and in common with other surveys [65, 104, 145-147] of similar homeless populations, the participants in this survey were found to have high levels of physical ill-health. The types of illness reported included, respiratory disease, chest disease, blood dyscrasias, and high blood pressure all of which could be associated with increased alcohol and tobacco usage.

The findings of this survey would support these other surveys [65, 145, 147], since 85% of the sample stated that they smoked cigarettes and over 30% stated that they drank alcohol at least daily. Moreover, the smoking behaviours of this sample compares unfavourably with the Scottish population as a whole. In Scotland in 2008, the percentage of people who smoked cigarettes was 25.2%, of whom 26% were men and 25% were women [148]. The proportion of men compared with women in this sample who stated that they smoked tobacco varied with age and reflected the findings of the Scottish Household Survey of 2007-2008 [149] which showed that that the highest proportions of people who smoked were men and were in older age groups. With regard to alcohol consumption, older age groups and men compared with women stated that they drank alcohol at least daily reflecting the national figures with regard to alcohol consumption, where 35% of men and 26% of women in Scotland consumed alcohol in excess of the recommended number of units/week in 2009 [150].

While these findings are consistent with the current health behaviours evident in the general population [150, 151] it is interesting to note that older participants smoked greater numbers of cigarettes. However, with regard to alcohol consumption, age group seemed unable to differentiate between those who admitted and those who did not admit to consuming alcohol on a daily basis. It is interesting to note that those categorised as 'houseless' compared with 'roofless' and other homelessness stated that they smoked less but consumed alcohol more frequently.

One in nine participants stated that were HIV+ and/or Hepatitis C+. This compares unfavourably with the prevalence of HIV (1 in 1,315) and Hepatitis C (1 in 220) in the general population of Scotland [152]. It may be proposed that this increased prevalence of HIV/Hepatitis C was associated with the 68% of participants who stated they had used street drugs and with the 24% of participants who were injecting drug users at the time of the survey. This compares unfavourably with the Scottish

population where problematic drug use was estimated to be 1.84% in 2003 for people aged between 15 and 54 years of age [153].

In conclusion, it seemed that a close association existed between health status and health behaviours. Findings here suggest that health behaviours could act as a means of characterising those who experienced rooflessness and other homelessness compared with those who were categorised as houseless. For instance, those who were injecting drug users and who consumed alcohol were more likely to be 'roofless' than 'houseless' and those who were previous drug users were more likely to be categorised as 'other homeless' than houseless. This suggests that differences in health behaviours could be used as additional descriptors of the ETHOS typology.

In general, the experience of physical ill-health was unevenly distributed between the genders with larger proportions of women compared with men stating that they had chest disease, bleeding disorders, or suffered from 'allergies'. This was supported by the finding that greater numbers of females as compared with males were taking prescribed medication.

It was notable that older compared with younger participants had greater ill-health. Again this is in keeping with the reported health behaviours, with the older participants, with smoking being linked with respiratory disease [147]. Additionally, sizeable proportions of older age groups compared with others had heart disease, and as reported earlier, this age group was more likely to have high levels of alcohol consumption, again demonstrating the documented link between excessive alcohol consumption and hypertension related ill-health [154] Larger proportions of older participants were prescribed medication. A possible explanation for this observation is the high levels of disease experienced by this group of homeless people. Another possible explanation is that many of the reported diseases while progressing with age

are observed in relatively younger age groups of people who experience homelessness with varying degrees of symptom severity.

Therefore it was of interest that the largest group of drugs prescribed were psychotropic in nature. Of those who stated the name of their prescribed medication over 30% had been prescribed anti-depressants, 20% anxiolytics and nearly 11% antipsychotics. This suggested that there was a high prevalence of mental ill-health in this population of homeless people compared with the Scottish population as a whole, where 10.4% of the population are prescribed anti-depressant drugs for daily use [155]. Moreover, when prescribed medication was compared across accommodation status, greater proportions of those who were categorised as 'houseless' stated they had prescribed medication compared with those who were 'roofless' or other homeless. It may be proposed that those who were 'houseless' had greater access to health services. There is support for this proposition since it was found that participants who were categorised as 'houseless' were characterised as being more likely to have health risks associated with being homeless in the past and present and hence may have accessed health and homelessness services as required. Participants who were categorised as being 'other homeless' were more likely to have a history of prior drug use and to be hypertensive whereas those who were currently 'roofless' were characterised by health risks associated with current health behaviours.

6.5 Oral health and oral health behaviours

Oral health is an important component of general health, which has the potential to impact upon physical and psychosocial wellbeing [109]. With this in mind, an exploration of the links between homelessness and oral health were considered as valuable, since homeless people have poor general health, and improving oral health together with access to services could be proposed as a method of making health gains for this disadvantaged population.

In agreement with other surveys which have shown that homeless people have poorer levels of dental health, than the general population [11, 96] the dental health of this population of homeless people was poor. The mean $D_{3cv}MFT$ was 16.98, with the mean number of decayed teeth being 4.48. The mean number of missing teeth was 8.71 and the mean number of restored teeth was 3.79. This suggested that decayed teeth had been extracted rather than restored. This compares poorly with the mean DMFT of the general population, whilst being consistent with findings of other oral health surveys of homeless populations [11]. In terms of age, the highest levels of untreated decay were seen in the 24-44 years age groups. In common with other similar surveys [6], which report an increase in edentulousness with age [6], the older participants (55+) in this survey also were noted to have significantly greater mean numbers of missing teeth than other age groups.

Poor plaque control, associated with not regularly brushing teeth, can lead to the development of periodontal disease. If left unchecked plaque, a soft, bacteria-filled biofilm derived from foodstuffs, forms around the surfaces of teeth and soft tissues in the mouth. The long-term presence of plaque, and calcified plaque, or calculus, on the surface where the tooth meets the gum – the gingival margin – can lead to the development of gingivitis or periodontitis [103], forms of periodontal disease. For the participants in this study, levels of mean plaque scores were high (1.08). There were no differences observed between the genders. The youngest participants (16-24 years) had lower mean plaque scores as compared with other age groups. Younger homeless people, therefore, had better oral hygiene levels and it may be suggested that this was linked with their oral ill-health experience as this group was also found to have higher mean numbers of standing teeth.

Oral cancer often presents as a painless ulcer in its early stages. These ulcers which are described as suspicious lesions, are frequently noted by a dentist at a routine dental

examination, when the patient themselves has either not noticed the lesion, or failed to attach the appropriate significance to the lesion [156].

Erratic dental attendance, poor oral hygiene, poor diet and indulgence in habitual behaviours such as immoderate alcohol consumption, smoking and drug taking are all risk factors for oral cancer [156]. Some homeless people, with their high risk lifestyles and low levels of dental attendance are a high risk category for oral cancer and have been found to be 95 times more likely, than the general population, to experience oral cancer [11].

In this survey, 15% of the participants were noted to have suspicious oral mucosal lesions, with male participants having a higher incidence of suspicious oral lesions affecting the lips, the buccal mucosa, the floor of mouth region and the palate. Older participants (45 years and above) had greater experience of suspicious oral mucosal lesions on the palate compared with other age groups. This high incidence of suspicious oral mucosal lesions has impacts for the provision of oral care for certain homeless sub-groups. In addition to lending credence to the argument that such groups of homeless people should be regularly screened for oral cancer, there is a requirement for both review of suspicious lesions and in some cases onward referral to specialist services. This presents a challenge to dental service providers as it can be very difficult to locate homeless people for review at an appropriate interval, due to unstable lifestyles. Many of this group of homeless people are extremely vulnerable and unable to take the initiative themselves in scheduling review appointments. This finding supports the view that there is a requirement for tailoring of healthcare and dental services for this population.

In the UK as a whole, the general population has seen a trend towards retention of the natural dentition, with the Adult Dental Health Survey [119], which is carried out every ten years to provide a snapshot of oral health within the UK showing reduced levels of

edentulousness in the general population. This trend does not extend to the homeless population. In this survey in Scotland, levels of total edentulousness were quite low (6%). In common with the reported levels in the general adult population in the UK [119], levels of edentulousness were found to rise with increased age. This phenomenon has also been observed in 'other homeless' populations [6].

As with the level of obvious caries experience, the incidence of edentulousness in the homeless population is likely to be explained by some of the impacts of the homeless lifestyle. Whereas the high levels of decay experienced by homeless people is related to the poor diet and low oral hygiene levels which often accompany the homeless lifestyle, the levels of edentulousness are related to the transient nature of the homeless lifestyle, which impacts on treatment provision and continuity of dental care.

The oral disease experience of this homeless population reflects that found elsewhere in the literature, for example in Boston, Kaste *et al* [4] found that 91.4% of a homeless population had untreated decay [4]. In Hong Kong, Luo and McGrath found that 90% of a homeless population had dental caries, mostly untreated [99]. Gelberg *et al* [96], conducting a study of oral health in the homeless in Los Angeles reported similarly elevated levels of decay, and higher levels of dental pathosis than the general population. In the U.K. homeless populations' experience of dental disease is also high. Studies in Leeds [98], Belfast [11] and Birmingham [70] have all demonstrated this increased dental disease experience, with homeless population in two of these cities found to have a DMFT (total number of decayed, missing or filled teeth) of 16.6 (Belfast [11]) and 15.9 (Birmingham [70]). This compares unfavourably with the DMFT scores for the general, settled population [106].

In addition to having high levels of untreated oral disease, the homeless people in this survey were shown to have relatively few dental restorations [11], as, where treatment is provided extractions are more frequently provided as a treatment option as opposed

to restorative interventions resulting in fewer homeless people retaining their natural teeth [157]. This combination of raised disease incidence, and low intervention levels are indicative of high levels of unmet dental treatment needs within homeless populations [11]. Homeless individuals are prone to development of periodontal disease as they tend to brush their teeth infrequently, and attend the dentist sporadically, therefore missing out on the preventive measures commonly instigated in the prevention of this disease.

The prevalence of periodontal disease in homeless populations has been shown to be high as compared with the general population [5, 11]. One study of the dental health of a homeless population in Birmingham [70] found that over 50% of the participants had excessively mobile (periodontally involved) teeth. One of the consequences of periodontal disease is tooth loss, which occurs when soft tissue and bony structures supporting the tooth recede due to the inflammatory process triggered by the actions of certain types of bacteria in the oral cavity [103]. In addition to having undesirable effects in the oral cavity, periodontal disease is also linked with concomitant medical problems, such as heart disease [128, 158]. In common illnesses such as diabetes periodontal disease requires long-term monitoring in order to prevent disease progression, and to ensure that potentially damaging disease sequelae are avoided. Prevention of periodontal disease is, therefore, important. Measures such as tooth brushing and professional plaque and calculus removal in the dental surgery are recommended in the prevention of this disease [103].

Alarmingly, homeless people experience an extremely high incidence of oral cancer, the most common of which is squamous cell carcinoma. Homeless people are ninety-five times more likely to experience oral cancer than the general population [11]. Oral cancer is treatable in its early stages. For the homeless, few of whom attend regularly for routine dental examination, detection of oral cancer often occurs at later stages of the disease, when disease progression has led to impaired function, which acts as a

prompt to seeking medical intervention. As early detection is beneficial for the prognosis of oral cancer, with effective treatment available, screening and preventive advice are priorities for this group. Dentists provide these vital interventions for the general population; this research has demonstrated that the homeless are not, however, accessing these conventional dental service arrangements, and within the general context of dental neglect are suffering as a consequence.

When the oral health data were analysed against a background of the ETHOS typology, it was found that oral disease experience was unequally distributed amongst the typological groups. Those participants who were categorised as 'other homeless' were found to have lower plaque scores, more standing teeth and absence of mucosal lesions. This group of people had the best cared for teeth and bore the lowest burden of oral ill-health. When this is considered in the light of the demography of those who constitute the 'other homeless' group, then it may be suggested that this is related to their younger age, and therefore shorter life experience of homelessness. This is of importance with regard to the tailoring of preventive dental care. It may be suggested that those who are categorised as 'other homeless' require dental health services which predominately have a primary preventive focus.

Participants who were categorised as 'houseless', had different treatment requirements. They were shown to have high plaque scores and mucosal lesions with fewer numbers of standing teeth. In other words this group, whilst retaining some teeth, had greater oral disease experience, including mucosal lesions and increased plaque scores. This suggests the need to tailor prevention and treatment to improve oral health status and, in this respect suggests a tertiary preventive strategy (i.e. a strategy which is aimed at reducing oral disease impacts for those who are already affected by oral disease, and to put in place interventions to prevent further disease) to restore oral health functioning and prevent further oral disease.

Participants categorised as 'roofless' were found to have high levels of plaque, high incidence of oral mucosal lesions, fewer standing teeth together with high levels of dental caries. This group of people had the most neglected dentitions and the highest levels of oral ill-health so there is a need to provide oral health treatment to restore function within a tailored preventive programme. Thus, from a viewpoint of oral disease, this sample of homeless participants' oral health can be used as additional descriptors to characterise the ETHOS typology and allow suggestions to be made for a tailored approach for oral health care.

6.6 Dental treatment experience and psycho-social factors

With regard to accessing dental services less than one third of this sample reported that they were registered with a dentist and over half of the sample had not attended a dentist in the last ten years. For those that had attended the main driver for attendance was pain. Less than a quarter of those who reported that they had attended a dentist recently, stated that had attending for routine dental examination. It would seem that although dental services for those experiencing homeless exist within Scotland, they are not being routinely accessed, therefore it seemed necessary to understand the barriers and enablers as experienced by those who participated in the survey.

The participants in this survey were asked to state how they would prefer to access dental services. In response to this nearly 80% stated that they would like to access drop-in dental services. Whilst such a service would be an ideal solution for providing care for a group of people who have attendance issues, this may present a problem with scheduling both routine care and review of existing and potentially progressive dental diseases.

Upon being asked to report the barriers which prevent them from attending for dental care the participants reported that stated that they found NHS dental treatment difficult

to find, they did not like waiting for treatment, and they wanted to know more about the dental treatment they were to receive. These findings are best viewed against a backdrop of competing priorities in which homeless people often find themselves trapped. Very often the reality of the homeless existence is such that homeless people find it very difficult to plan ahead, and thus routine appointments are often missed.

Nearly 60% of the sample stated that they would prefer to take painkillers than attend for dental treatment. This finding suggests that oral health and attendance for pain relief is of a lower priority than trying to find, for example somewhere to live. Previous research has reported that so many factors in the lives of homeless people are beyond their control that they tend to neglect themselves to the point where they only attend healthcare services when a problem reaches an acute level beyond which it cannot be ignored any longer [87].

Given that the responses of the participants with regard to the barriers to accessing dental care it became apparent that two attitudes–'access inhibition' and 'access anxiety' affected their resolve to attend for dental treatment. The analysis showed that females in particular were more affected by these two attitudes which acted as barriers to dental care, whereas older participants were less anxious about accessing dental care.

When the barrier of dental anxiety was more carefully examined using the modified dental anxiety scale (MDAS), the mean score for the sample was 11.7 suggesting that as a whole they experienced an equivalent level of dental anxiety compared with the general population [133]. However unlike the general population 20% of the sample (compared with 12% of the general population) were categorised as dentally phobic. The participants' greatest fears were having their teeth drilled and receiving local anaesthetic.

Reflecting the attitudinal findings, females compared with males had significantly higher mean scores for dental anxiety with participants aged between 45 years and older having lower mean scores for dental anxiety compared with those in younger age groups. This is similar to the reported UK general population norms [133] where dental anxiety levels were reported to be higher in younger age groups.

The impacts of dental disease are serious and have the potential to be life threatening, as in the case of infection resulting from untreated dental abscess. Experience of dental disease can lead to pain, swelling interrupted sleep, reduced ability to eat and other deleterious effects. Furthermore, dental disease experience can impact upon the appearance of the sufferer and affect the way in which others perceive them and negatively impact their self-worth [159]. Higher levels of dental disease experience have been linked with reduced oral health related quality of life [11], and these impacts can be substantial [112]. Previous research has also shown severe oral health impairment as well as high prevalence, extent and severity of oral health impacts in homeless people [160].

In order to examine the effect of oral disease on the oral health-related quality of life of this sample of homeless people the OHIP-14 was used. Oral health-related quality of life impacts were found to be high amongst the participants in this survey. Twenty-five percent of the sample reported feeling self-conscious very often, and 23% reported feeling embarrassed very often about the appearance of their mouth and teeth [11, 116]. Those participants with greater numbers of decayed teeth, increased experience of periodontal disease had significantly higher oral health impacts mean scores [11]. In addition, participants reported that they found their lives less satisfying because of problems with their mouth and teeth. Reported levels of dental pain were high.

For this population of homeless people, women and younger people their oral health impacted upon their psychological functioning with regard to psychological discomfort

and disability. In comparison with the Scottish sample from the Adult Dental Health Survey 1998 [135], larger proportions of participants in the homeless sample experienced greater numbers of impacts compared with the UK population. Therefore, although this group of people were not routinely accessing care, their dental ill-health negatively impacted on their quality of life. This is likely to have an effect on their reliance on medication, prescribed or otherwise, thus affecting levels of addiction and having a deleterious effect on their general health.

A very high number of participants (68%) were described as suffering from depression – a higher prevalence than found in the general population [161]. Female participants those in older age groups had significantly higher mean scores for depression, this is in keeping with rates of depression in the general Scottish population [161].

Using a discriminant analytic approach it was possible to differentiate between the 3 categories of the ETHOS typology using measures of psycho-social wellbeing. People who were categorised as 'other homeless' were characterised as being able to function in terms of quality of life and social interaction. This may have been related to being young and not having experienced the physical and emotional impoverishments of long-term homelessness. In contrast people categorised as 'roofless', who tended to be older with greater experience of homelessness were depressed with greater impacts of the depression upon their daily routines and psycho-social functioning. For those who were 'houseless' the burden of the homeless lifestyle had taken its toll as reflected in the impact of their depressive state upon their psycho-social wellbeing.

6.7 Limitations

Working with homeless populations is acknowledged as being challenging, particularly in terms of recruiting participants into a study such as this. This potentially impacts on the study design, in this case influencing the way in which sampling was carried out. It was decided to gather a sample using a convenience sampling method where a

snowball effect was generated in order to minimise the impacts of lack of randomisation on the sample. Whilst this has the potential to lead to bias, a large sample size was generated in order to counteract this.

Obvious decay experience was assessed using visual dentinal caries (D_{3cv}) [106]. It is likely that the levels of dental caries produced were an underestimate, as enamel-only lesions were not recorded.

Another limitation of this survey was the use of 'self-report' methodology in the survey. This is a potential area for bias, where participants may not answer fully truthfully leading to skewing of the data. This method of data collection is well recognised within the fields of social and behavioural sciences and organisational research [162], and realistically there is no viable alternative method by which to gather this type of data within the structures of a homeless population. Nevertheless and taking these limitations into account this survey has been concerned with the homeless population in Scotland, the findings of this survey have been consistent with other similar surveys in other countries suggesting that the results are reliable and valid.

6.8 Conclusions

The use of a proposed enhanced ETHOS typology as a means of tailoring health service provision to permit engagement is of central importance in improving oral health. It is considered as an essential function of restoring dignity and is considered part of a holistic recovery for those experiencing homelessness. This is in consistent with a comprehensive, common risk factor approach where all aspects of health are addressed in order to promote integrated healthcare services [108]. Jago *et al* [6], whilst working with a group of homeless men in Australia, noted that 'amongst themselves it is acceptable to have broken teeth'. Indeed the publicly recognised face of homelessness is one with poor dental health. However, this research, has shown that the high levels of oral health impacts on physical and psychological functioning, demonstrating that

although they may not overly demonstrate it, or indeed access treatment homeless people feel the pain of their disease. Consequently, if as DePalma *et al* [158] have reported, oral health has an increasingly higher priority for those homeless seeking to rehabilitate themselves then such strategies to inform the engagement process with health services by tailoring to the specific needs using the expanded ETHOS typology must be considered.

Using the data obtained was possible to show that additional demographic, oral health, health and psycho-social wellbeing descriptors existed which could characterise the various dimensions of the ETHOS [8] typology. Accordingly, the 'houseless' people were characterised as being older, female, living within a one or two-parent family and within an urban NHS Board area. With regard to their oral health they had higher levels of dental plaque, higher experience of mucosal lesions, and had retained fewer of their own natural teeth. In terms of their health status they were characterised as having increased physical and emotional health impacts as reflected in their taking prescribed medication and some high risk behaviours. The 'other homeless' group were characterised as having lower physical and psychological health impacts and health risks which were conceptualised as being similar to those within the general population. They had lower levels of plaque and mucosal lesions and retained greater numbers of their own natural teeth. Finally, the 'roofless' group of homeless people were characterised in terms of having increased health risks being affected by depression and associated reduced function. They had higher levels of dental plaque, and higher levels of dental caries experience and more missing teeth.

One way of supporting the aim of this thesis is to examine the pathways towards homelessness which are often linked with the individual ability of a person to cope when placed in a set of circumstances rendering them vulnerable to homelessness. Each person reacts differently to the various demands of their lifestyle, and it could be argued that those with less well developed coping skills may have mental health issues

and/or intellectual disabilities together with development needs. This combination of need acts in tandem with destabilising factors such as financial issues and creates an unstable environment predisposing the individual to homelessness. It is proposed therefore that the oral health, health and psycho-social well-being factors are related to the ETHOS typology and assist in understanding people's experience of homelessness. Moreover it is suggested that the inclusion of demographic and psycho-social factors within the ETHOS typology may act as a first step in the process of tailoring health care interventions to the specific needs of the homeless person as characterised with this proposed enhanced typology.

This work demonstrates the importance of adopting a common risk factor type of approach [108] to healthcare provision for homeless people, whereby all facets of healthcare are considered in an integrated process. The additional descriptors of oral health, health and psycho-social wellbeing within an expanded ETHOS typology will provide an opportunity for this type of integrated strategy for the tailoring of health care provision to the specific needs of homeless people to be considered. The proposed enhanced ETHOS typology would be of value to inform the tailoring of health service provision and to enable effective and multidisciplinary working to promote the health and psycho-social wellbeing of people experiencing homelessness.

7.0 Recommendations

It is recommended that:

1. The additional health, oral health and psycho-social well-being descriptors which were found to characterise homeless people may be used as a method by which to enhance the ETHOS typology to include health dimension characterisation to permit engagement with health services. This enhanced ETHOS typology could be used to facilitate the provision of more accessible, healthcare systems, where homeless populations are viewed within the context of typology when planning service delivery.

2. An enhanced ETHOS typology will allow the development of tailored health service provision, specifically directed towards the needs of those experiencing homelessness.

3. Multi-disciplinary approach to the healthcare provision for homeless people based on the categorisation of homelessness is necessary in order to promote direct engagement with health services.

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9.0 Appendices

APPENDIX 9.1a:

Oral Health Promotion initiatives undertaken by selected NHS boards

NHS BOARD	CURRENT ORAL HEALTH PROMOTION	FUTURE PLANS
Ayrshire & Arran	Oral Health Promotion teams visit hostels to provide information, advice and resources. Ongoing Oral hygiene provided by identified person e.g. Health Visitor within all 3 CHP areas. Public health nurses act as facilitators. Advice posters in hostels.	Extension of Oral hygiene programmes throughout area
Fife	No information provided.	
Forth Valley	Toothbrushes & toothpaste supplied to all recognised homeless establishments	Lead officer at HS. Short life working groups, including specific staff for developing progs. Development of initiatives incorporating local flexibility, ongoing work and backed by national support.
Greater Glasgow	Supply Oral hygiene resource packs to ER Unit & Clydebank, Liaise with local GP.	Training for staff within unit to support parents & carers of pre 5's. Identifying treatment options, directing staff to OH services

NHS BOARD	CURRENT ORAL HEALTH PROMOTION	FUTURE PLANS
Lanarkshire	Local authority staff given oral health packs for distribution along with information regarding dental services access	Data to be gathered from GDPs to evaluate attitudes amongst this group in treating homeless patients.
Lothian	Provision & improved access of services. Team for drug users & homeless. Chair-side advice. Ad hoc talks. Business cards & flyers promoting clinical services at accessible locations. Advice leaflet 'Methadone and Your Teeth'	Development of Oral Health Promotion Strategy using common risk factor approach
Tayside	Dental Service and hygienist 'piggybacks' dental services onto mainstream nursing services to improve uptake.	Establish stronger links with drop-in centres.

APPENDIX 9.1b:

Active treatment provision of selected NHS Boards for the homeless

NHS BOARD	CURRENT DENTAL SERVICE PROVISION	FUTURE PLANS
Ayrshire & Arran		Extension of programmes throughout area
Fife	No information provided	
Forth Valley	Dental clinics open to homeless	Development of initiatives incorporating local flexibility, ongoing work and backed by national support.
Greater Glasgow	Dental services available and being aligned with other successful health initiatives to improve uptake of services.	Identifying treatment options, directing staff to areas of greatest need
Lanarkshire	Local authority staff and voluntary staff act as facilitators in appointment making and access to dental services Additional evening session targeted at homeless	More information regarding dental health to be gathered by Local authority staff When carrying out their initial housing needs assessment

NHS BOARD	CURRENT DENTAL SERVICE PROVISION	FUTURE PLANS
Lothian	Provision & improved access of services. Team for drug users & homeless. Flyers promoting clinical services at accessible locations.	Development of Oral Health Promotion Strategy using common risk factor approach
Tayside	Dental Service and hygienist 'piggybacks' dental services onto mainstream nursing services to improve uptake. Homeless population specifically targeted for dental advice and care.	Establish stronger links with drop-in centres.

APPENDIX 9.1c:

Action being taken and the progress of selected NHS boards in adhering to the standards

Health and Homelessness Standard (HHS)	Action being taken	Is the HHS being up held?	
1. Making efforts to understand the profile of the homeless person	Oral health needs assessment	Ayrshire & Arran Fife Lanarkshire Lothian Glasgow&Clyde Tayside	√ √ √ √ √
2. Planning and delivering: sustaining improved health outcomes for homeless	Structured programmes of care	Ayrshire & Arran Fife Lanarkshire Lothian Glasgow&Clyde Tayside	√ √ √ √ √
3. Partnership Working	Plans involve services other than dental, or working with other boards	Ayrshire & Arran Fife Lanarkshire Lothian Glasgow&Clyde Tayside	√ √ √ √ √
4. Ensure homeless people have equitable access to all health services	Health Promotion	Ayrshire & Arran Fife Lanarkshire Lothian Glasgow&Clyde Tayside	√ √ √ √ √

Health and Homelessness Standard (HHS)	**Action being taken**	**Is the HHS being up held?**	
5. Ensuring a positive response to any requests for care from homeless	Information sharing	Ayrshire & Arran Fife Lanarkshire Lothian Glasgow&Clyde Tayside	√ √ √ √ √
6. Are Action Plans being implemented?		Ayrshire & Arran Fife Lanarkshire Lothian Glasgow&Clyde Tayside	√ √ √ √ √

APPENDIX 9.2a:

Exclusion criteria form design: Article Exclusion Questions

Research Question	'*Does the empirical evidence show an association between oral health and homelessness?*

Paper Number	
First Author	
Title	
Year Published	

	Yes	**No**
1. Language other than English/French?		
2. Article other than original research?		
3. Study not focussed on adult homeless population?		
4. Study other than cohort/cross-sectional population study or randomised control study?		
5. Study not including report on oral health status as examined by a dental health professional?		
Paper Excluded? NBA 'yes' box ticked means paper is discounted		

APPENDIX 9.2b:

Sample of excluded papers (excluded following examination of full texts) with reasons for exclusion

CITATION	REASON FOR EXCLUSION
Pizem, P. 1994 the state of oral and dental health of the homeless vagrant population of Montreal. J Can Dent Assoc. Dec; 60 (12):1061-5.	No dental examination
Richards, W. Keauffling, J. Homeless who Accessed a Healthy Living centre in Swansea, South Wales: An Assessment of the Impact of Oral Ill Health. Prim Dent Care. 2009 Jul; 16 (3) 94-8	No dental examination
Allukian M, Jr. Oral health: an essential service for the homeless. J Public Helath Dent. 1995 Winter; 55(1):8-9.	This article was sourced using the 'snowball' technique of checking for additional references in qualifying texts. It was following examination of the full text of the original article as it is a commentary piece.
CITATION	REASON FOR EXCLUSION
Chi, D. Milgrom, P. The oral health of homeless adolescents and young adults and determinants of oral health; preliminary findings. Spec Care Dentist. 2008 Nov-Dec;;28 (6):237-42	No dental examination

Visvanathan, R. Good oral health, adequate nutrient consumption and family support are associated with a reduced risk of being underweight amongst older Malaysian residents of publicly funded shelter homes. 2006. asia Pacific Journal of Clinical Nutrition 15(3):400-405	Excluded as relies on self-reported data, no dental examination
Di Marco, MA *et al* The pediatric nurse practitioner's role in reducing oral health disparities in homeless children. J. Peditr Health Care. 2009. Mar-Apr;23(2):109-16	No dental examination
Daly, B, Newton, T. Patterns of dental service use among homeless people using a targeted service. J Pub Dent Health. 2010. 70 (1):45-51	This was a study carried out using case note reviews, there was no dental examination of participants

APPENDIX 9.2c:

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies[114]:*

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorised
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

APPENDIX 9.3:

The IRAS Judgement

NRES Queries Line [queries@nres.npsa.nhs.uk]

Sent: Mon 21/04/2008 11:40

To: Jennifer Collins

Our leaflet "Defining Research", which explains how we differentiate research from other activities, is published at:

http://www.nres.npsa.nhs.uk/applicants/help/guidance.htm#audit

Based on the information you provided I would say this is service evaluation, our advice is that the project is not considered to be research according to this guidance.

Therefore it does not require ethical review by a NHS Research Ethics Committee.

If you are undertaking the project within the NHS, you should check with the relevant NHS care organisation(s) what other review arrangements or sources of advice apply to projects of this type. Guidance may be available from the clinical governance office.

Although ethical review by a NHS REC is not necessary in this case, all types of study involving human participants should be conducted in accordance with basic ethical principles such as informed consent and respect for the confidentiality of participants.

When processing identifiable data there are also legal requirements under the Data Protection Act 2000. When undertaking an audit or service/therapy evaluation, the investigator and his/her team are responsible for considering the ethics of their project with advice from within their organisation. University projects may require approval by the university ethics committee.

This response should not be interpreted as giving a form of ethical approval or any endorsement of the project, but it may be provided to a journal or other body as evidence that ethical approval is not required under NHS research governance arrangements.

However, if you, your sponsor/funder or any NHS organisation feel that the project should be managed as research and/or that ethical review by a NHS REC is essential, please write setting out your reasons and we will be pleased to consider further.
Where NHS organisations have clarified that a project is not to be managed as research, the Research Governance Framework states that it should not be presented as research within the NHS.

Regards

IRAS (Integrated Research Application System) is now available for use and consultation. To view IRAS and for further information visit www.myresearchproject.org.uk

Queries Line
National Research Ethics Service
National Patient Safety Agency
4-8 Maple Steet
London
W1T 5HD

Website: www.nres.npsa.nhs.uk

Email: queries@nres.npsa.nhs.uk

Ref: 04/01

**

APPENDIX 9.4:

University of Dundee ethical approval

-----Original Message-----
From: Peter Willatts [mailto:p.willatts@dundee.ac.uk]
Sent: 31 March 2009 14:11
To: Emma Coles
Cc: Elizabeth Evans
Subject: Ethics application UREC 9005, An oral health preventive intervention for homeless populations

Dear Emma
We see no ethical problems with your proposal, and I am happy to approve your study. You may begin the research. We do suggest you make a couple of minor changes:

1. In the Consent Form, you should add a line for the printed Name of the Participant. Signatures can often be difficult to read.
2. In the Participant Information Sheet, please add information about how long you will keep the audio recordings before they are destroyed.

Could you please send copies of the changed documents by email to me, rather than the UREC secretary Elizabeth Evans, who is on sick leave at the moment?

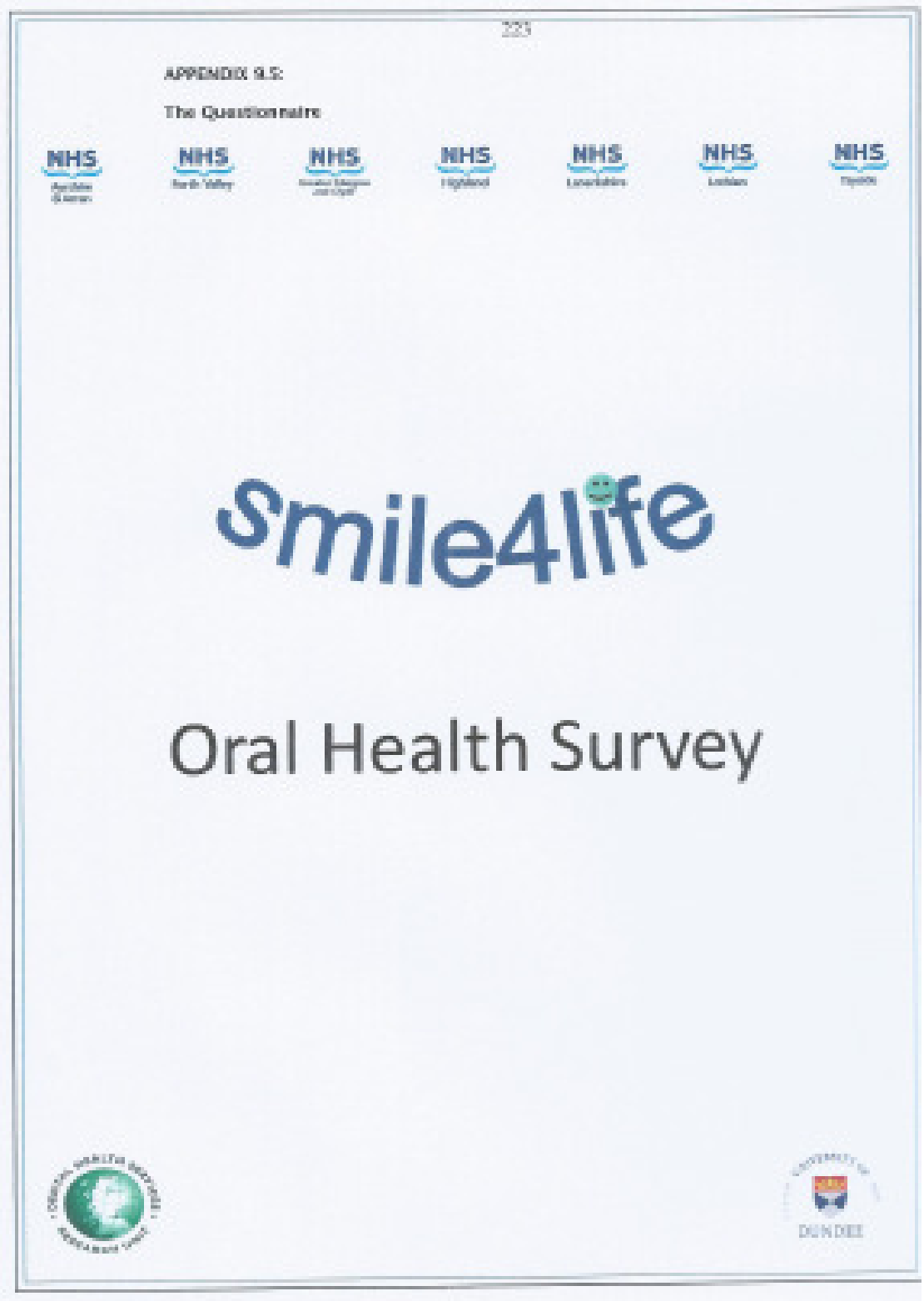
With best wishes,

Peter Willatts
Chair, University Research Ethics Committee

Dr Peter Willatts
School of Psychology, University of Dundee, Nethergate, Dundee, DD1 4HN, UK.
Email: p.willatts@dundee.ac.uk
Tel: +44 (0)1382 384618; 384623
Fax: +44 (0)1382 229993

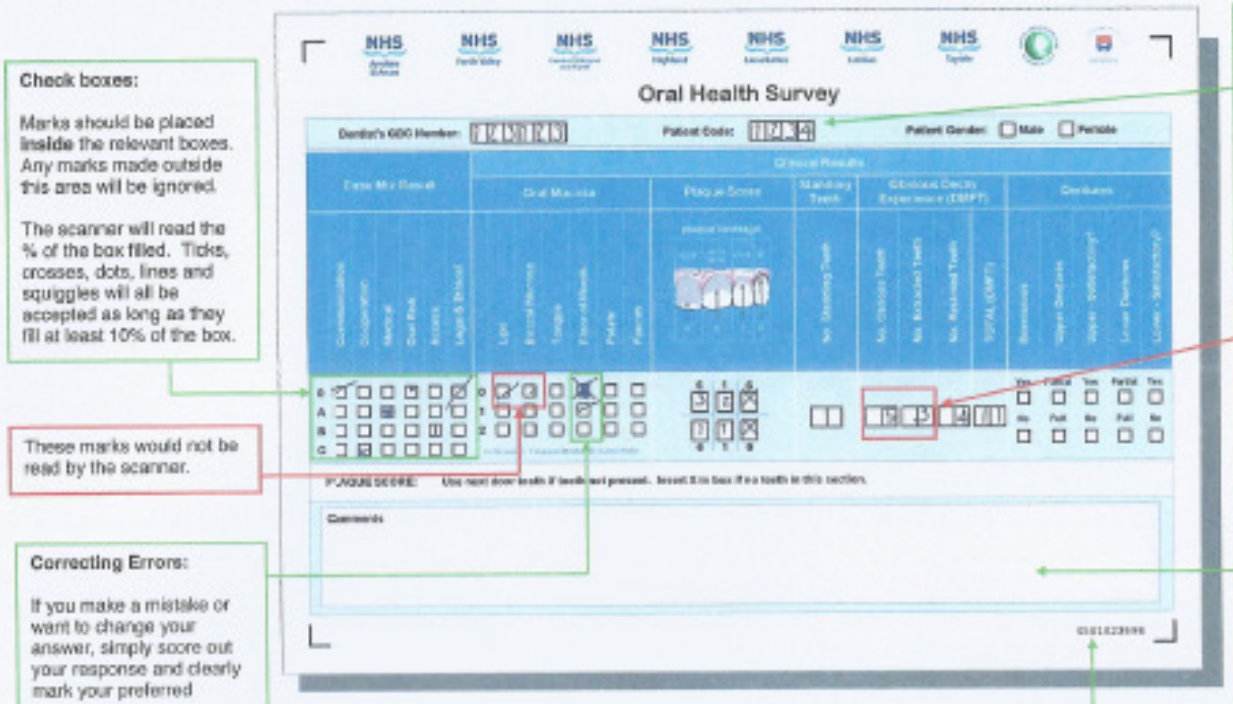
APPENDIX 9.5:

The Questionnaire



GUIDE FOR COMPLETING SCANNABLE FORMS

For best results, please complete all pages of the survey using black or blue ink. Pencil and coloured pens such as green and red should be avoided. The diagram below gives examples of how to complete check boxes and text boxes to maximise scanner reading. These examples apply to all pages in the survey.



Check boxes:

Marks should be placed **inside** the relevant boxes. Any marks made outside this area will be ignored.

The scanner will read the % of the box filled. Ticks, crosses, dots, lines and squiggles will all be accepted as long as they fill at least 10% of the box.

These marks would not be read by the scanner.

Correcting Errors:

If you make a mistake or want to change your answer, simply score out your response and clearly mark your preferred response.

The scanner will recognise two boxes are marked and hold this for human verification in the system.

Text boxes:

Where text boxes are provided, please ensure each character is placed in a separate box.

The scanner will read individual characters written in different styles e.g. 4 and 4 or 7 and 7

Please try to avoid writing across boxes.

Please also ensure that 3s and 5s are clearly written to avoid them from being misread by the scanner.

Larger comments boxes will not be electronically read by the scanner and can be completed as you would for any other form.

Please, however, write as legibly as you can.

The number and corner marks are used by the scanner to identify the form and page being scanned.

These must not be written on or damaged in any way.

CONFIDENTIAL MEDICAL HISTORY FORM

Patient Code: ☐☐☐☐ Date of Birth: ☐☐ / ☐☐ / ☐☐
D D M M Y Y

	Yes	No
Are you receiving treatment from a doctor, hospital, clinic or Specialist?	☐	☐
Are you taking or using any medicines, pills, syrups, ointments, puffers or injectors prescribed for you by a doctor? *If yes, please list:*	☐	☐
Have you ever had rheumatic fever?	☐	☐
Have you ever been told you had a heart murmur?	☐	☐
Have you had angina?	☐	☐
Have you had blood pressure problems?	☐	☐
Have you ever had a heart attack?	☐	☐
Do you suffer from any infection disease, e.g. HIV, hepatitis?	☐	☐
Do you have asthma or any other lung disease?	☐	☐
Do you have epilepsy?	☐	☐
Do you have diabetes?	☐	☐
Do you bruise or bleed easily?	☐	☐
Are you allergic to any medicine, foods or materials?	☐	☐
Are you pregnant?	☐	☐
Do you chew tobacco, pan or betel?	☐	☐
Are there any other details you feel we should know about your medical history?	☐	☐

DENTAL HEALTH QUESTIONNAIRE

Gender: ☐ Male ☐ Female

Ethnic origin: ☐ White ☐ African/Caribbean ☐ Asian ☐ Chinese ☐ Gypsy/Traveller ☐ Other: _____

Registered with a dentist: ☐ Yes ☐ No

Occupation or previous occupation: _____

Family Type: ☐ Single ☐ Single with Partner ☐ 1 Parent Family ☐ 2 Parent Family

Number of children living with you: ☐ 1 ☐ 2 ☐ 3 ☐ 4+

Living status:

Rooflessness	Living rough	☐ Public space or external space
	In emergency accommodation	☐ Night shelter
Houselessness	In accommodation for the homeless	☐ Homeless hostel ☐ Temporary accommodation ☐ Transitional supported accommodation
	In Women's shelter	☐ Women's shelter accommodation
	In accommodation for immigrants	☐ Temporary accommodation/reception centres ☐ Migrant workers' accommodation
	Released from institutions	☐ Prison/Young Offenders institutions ☐ Hospital ☐ Children's institutions/homes
	Receiving longer-term support (due to homelessness)	☐ Residential care for older homeless people ☐ Supported accommodation for formerly homeless people

Reason for homelessness: _____

	Yes	No	Prefer not to say
Have you ever used drugs?	☐	☐	☐
Do you continue to use drugs?	☐	☐	☐
IVDU?	☐	☐	☐
Do you drink alcohol most days?	☐	☐	☐
Do you smoke cigarettes? If yes, how many per day? ☐☐☐	☐	☐	☐

	Not anxious	Slightly anxious	Fairly anxious	Very anxious	Extremely anxious
If you went to your dentist for TREATMENT TOMORROW, how would you feel?	☐	☐	☐	☐	☐
If you were sitting in the WAITING ROOM (waiting for treatment), how would you feel?	☐	☐	☐	☐	☐
If you were about to have your TEETH DRILLED, how would you feel?	☐	☐	☐	☐	☐
If you were about to have your TEETH SCALED AND POLISHED, how would you feel?	☐	☐	☐	☐	☐
If you were about to have a LOCAL ANAESTHETIC INJECTION in your gum, above an upper back tooth, how would you feel?	☐	☐	☐	☐	☐

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Dental Attendance

Have you been to a dentist in the last year? ☐ Yes ☐ No

If no, how long ago was your last appointment with a dentist?

☐ Between 1 to 2 years ago ☐ Between 3 to 5 years ago ☐ Between 10 to 20 years ago ☐ Never

☐ Between 2 to 3 years ago ☐ Between 5 to 10 years ago ☐ More than 20 years ago

What made you go to the dentist the last time you went?

☐ Trouble with teeth ☐ Check-up ☐ Other:

Dental Treatment

Have you ever had:	Yes	No	Don't know
Fillings	☐	☐	☐
An injection in your gum	☐	☐	☐
An injection in your arm	☐	☐	☐
X-rays	☐	☐	☐
Extractions	☐	☐	☐
Laughing gas (RA)	☐	☐	☐
Fluoride treatments	☐	☐	☐
Fissure sealants	☐	☐	☐
General anaesthetic (gas)	☐	☐	☐
An abscess	☐	☐	☐
Crowns	☐	☐	☐
Bridge work	☐	☐	☐
A scale and polish	☐	☐	☐
Dentures	☐	☐	☐

	Definitely feel like that	To some extent	Don't know	Don't feel like that
If I had toothache I'd rather take painkillers than go to the dentist	☐	☐	☐	☐
The worst part of going to the dentist is the waiting	☐	☐	☐	☐
I'd like to be able to drop in at the dentist without an appointment	☐	☐	☐	☐
Dental receptionists are not very helpful or welcoming	☐	☐	☐	☐
Going to the dentist is like being processed on a conveyor belt	☐	☐	☐	☐
I'd like to know more about what the dentist is going to do and why	☐	☐	☐	☐
I don't want fancy (intricate) dental treatment	☐	☐	☐	☐
I don't like lying flat in the dental chair	☐	☐	☐	☐
I find NHS dental treatment difficult to find	☐	☐	☐	☐

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In the last 12 months:	Never	Hardly ever	Occasionally	Fairly often	Very often
have you ever had trouble pronouncing any words because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you felt your sense of taste has worsened because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you had painful aching in your mouth?	☐	☐	☐	☐	☐
have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you been self-conscious because of your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you felt tense because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐
has your diet been unsatisfactory because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you had to interrupt meals because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you found it difficult to relax because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you been a bit embarrassed because of your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you been a bit irritable with other people because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you had difficulties doing your usual jobs because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you felt that life in general was less satisfying because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐
have you been totally unable to function because of problems with your teeth, mouth or dentures?	☐	☐	☐	☐	☐

	Rarely or none of the time (less than 1 day)	Some or little of the time (1-2 days)	Occasionally or a moderate amount of the time (3-4 days)	Most or all of the time (5-7 days)
I was bothered by things that usually don't bother me	☐	☐	☐	☐
I did not feel like eating; my appetite was poor	☐	☐	☐	☐
I felt that I could not shake off the blues even with help from my family or friends	☐	☐	☐	☐
I felt I was just as good as other people	☐	☐	☐	☐
I had trouble keeping my mind on what I was doing	☐	☐	☐	☐
I felt depressed	☐	☐	☐	☐
I felt that everything I did was an effort	☐	☐	☐	☐
I felt hopeful about the future	☐	☐	☐	☐
I though my life had been a failure	☐	☐	☐	☐
I felt fearful	☐	☐	☐	☐
My sleep was restless	☐	☐	☐	☐
I was happy	☐	☐	☐	☐
I talked less than usual	☐	☐	☐	☐
I felt lonely	☐	☐	☐	☐
People were unfriendly	☐	☐	☐	☐
I enjoyed life	☐	☐	☐	☐
I had crying spells	☐	☐	☐	☐
I felt sad	☐	☐	☐	☐
I felt that people dislike me	☐	☐	☐	☐
I could not get "going"	☐	☐	☐	☐

NHS Ayrshire & Arran | NHS Forth Valley | NHS Greater Glasgow and Clyde | NHS Highland | NHS Lanarkshire | NHS Lothian | NHS Tayside

Homeless People's Oral Health Improvement Survey

Dentist's GDC Number: ☐☐☐☐☐☐ Location Code: ☐ Patient Code: ☐☐☐☐ Patient Gender: ☐ Male ☐ Female

Patient Age					Case Mix Result							Clinical Results																				
												Oral Mucosa							Plaque Score	Obvious Decay Experience (DMFT)				Dentures								
0 - 4 years	5 - 15 years	16 - 19 years	20 - 64 years	65 + years		Communication	Cooperation	Medical	Oral Risk	Access	Legal & Ethical		Lips	Buccal Mucosa	Tongue	Floor of Mouth	Palate	Fauces	plaque coverage:	No. Carious Teeth	No. Extracted Teeth	No. Restored Teeth	TOTAL (DMFT)	Edentulous		Upper Dentures		Upper - Satisfactory?		Lower Denture		Lower - Satisfactory?
☐	☐	☐	☐	☐	0	☐	☐	☐	☐	☐	☐	0	☐	☐	☐	☐	☐	☐		☐☐	☐☐	☐☐	☐☐	Yes	☐	Partial	☐	Yes	☐	Partial	☐	Yes	☐
					A	☐	☐	☐	☐	☐	☐	1	☐	☐	☐	☐	☐	☐						No	☐	Full	☐	No	☐	Full	☐	No	☐
					B	☐	☐	☐	☐	☐	☐	2	☐	☐	☐	☐	☐	☐														
					C	☐	☐	☐	☐	☐	☐																						

0 = No Lesion 1 = Lesion (Mucosa) 2 = Lesion Visible

LOG DIARY (Comments section)
Please document any cases below where:

- It is unclear from the guidance which score to allocate.
- You feel that the relative complexity of the case warrants a grade other than that proposed.
- You are unable to complete one of the clinical sections of the form.

Comments

If there is anything else you want to tell us about your mouth/teeth/dentures, or going to the dentist, please use the box below.

THANK YOU

If you would like to talk about any part of this survey, or any other aspects of your dental health, please contact:

Emma Coles on 01382 420053 or email e.coles@chs.dundee.ac.uk

APPENDIX 9.6: Access inhibition and access anxiety scale items as compared with age

ACCESS SCORES		Mean	95% Confidence Intervals Lower	Upper	F (df)	p
Inhibition scale items						
AI1 I'd like to know more about what the dentist is going to do and why	16-24	2.66	2.49	2.83	0.569 (4)	0.685
	25-34	2.75	2.59	2.90		
	35-44	2.64	2.46	2.83		
	45-54	2.68	2.44	2.92		
	55+	2.89	2.57	3.21		
AI2 Dental receptionists not very helpful or welcoming	16-24	1.93	1.78	2.08	1.350 (4)	0.250
	25-34	1.86	1.71	2.00		
	35-44	1.84	1.67	2.00		
	45-54	1.64	1.44	1.83		
	55+	1.87	1.59	2.16		
AI3 I find NHS treatment difficult to find	16-24	2.43	2.26	2.60	0.766 (4)	0.548
	25-34	2.61	2.44	2.77		
	35-44	2.55	2.36	2.73		
	45-54	2.43	2.18	2.67		
	55+	2.60	2.24	2.96		
AI4 Going to the dentist is like being processed on a conveyer belt	16-24	2.27[2]	2.11	2.43	4.225 (4)	0.002
	25-34	1.98[1,2]	1.84	2.12		
	35-44	1.99[1,2]	1.82	2.16		
	45-54	1.79[1]	1.58	2.00		
	55+	1.81[1,2]	1.53	2.09		
AI5 I'd like to be able to drop in at the dentist without an appointment	16-24	3.20	3.05	3.35	0.661 (4)	0.619
	25-34	3.25	3.21	3.48		
	35-44	3.20	3.04	3.37		
	45-54	3.30	3.08	3.51		
	55+	3.28	2.99	3.57		
AI6 I don't want intricate dental treatment	16-24	2.34	2.17	2.50	0.582 (4)	0.712
	25-34	2.31	2.16	2.47		
	35-44	2.47	2.29	2.65		
	45-54	2.32	2.08	2.57		
	55+	2.31	1.97	2.65		

*The suffixes show the significant differences in mean Access Inhibition (AI1-AI6) and Access Anxiety (AA1-AA3) scores which exist between age groups

ACCESS SCORES		Mean	95% Confidence Intervals Lower	Upper	F (df)	p
Anxiety scale items						
AA1 If I had toothache I'd rather take painkillers than go to the dentist	16-24	2.78[2]	2.62	2.95	5.304 (4)	0.000
	25-34	2.84[2]	2.68	3.00		
	35-44	2.63[2]	2.44	2.81		
	45-54	2.48[1]	2.22	2.74		
	55+	2.67[1]	1.74	2.41		
AA2 The worst part of going to the dentist is waiting for treatment	16-24	2.61	2.43	2.78	0.541 (4)	0.705
	25-34	2.57	2.42	2.73		
	35-44	2.53	2.35	2.72		
	45-54	2.42	2.17	2.67		
	55+	2.44	2.08	2.79		
AA3 I don't like lying flat in the dental chair	16-24	1.45	1.78	2.11	1.162 (4)	0.326
	houseless	1.90	1.74	2.05		
	35-44	1.72	1.55	1.88		
	45-54	1.94	1.70	2.19		
	55+	1.95	1.62	2.27		

*The suffixes show the significant differences in mean Access Inhibition (AI1-AI6) and Access Anxiety (AA1-AA3) scores which exist between age groups

APPENDIX 9.7: Access inhibition and access anxiety scale items as compared with category of homelessness

ACCESS SCORES		Mean	95% Confidence Intervals Lower	Upper	F (df)	p
Inhibition scale items						
AI1 I'd like to know more about what the dentist is going to do and why	roofless	2.74	2.36	3.12	0.038 (2)	0.963
	houseless	2.70	2.59	2.80		
	other	2.69	2.50	2.87		
AI2 Dental receptionists not very helpful or welcoming	roofless	2.19	1.81	2.56	2.102 (2)	0.123
	houseless	1.83	1.74	1.92		
	other	1.86	1.69	2.03		
AI3 I find NHS treatment difficult to find	roofless	2.71	2.34	3.09	1.147 (2)	0.318
	houseless	2.50	2.39	2.61		
	other	2.64	2.44	2.84		
AI4 Going to the dentist is like being processed on a conveyer belt	roofless	2.22	1.84	2.60	1.566 (2)	0.210
	houseless	1.98	1.88	2.07		
	other	2.11	1.94	2.29		
AI5 I'd like to be able to drop in at the dentist without an appointment	roofless	3.52	3.24	3.81	2.315 (2)	0.100
	houseless	3.23	3.14	3.33		
	other	3.38	2.23	3.54		
AI6 I don't want intricate dental treatment	roofless	2.26	1.86	2.66	0.201 (2)	0.818
	houseless	2.36	2.26	2.47		
	other	2.31	2.12	2.50		
Access scale items						
AA1 If I had toothache I'd rather take painkillers than go to the dentist	roofless	2.98	2.61	3.35	1.246 (2)	0.288
	houseless	2.67	2.56	2.78		
	other	2.67	2.48	2.85		
AA2 The worst part of going to the dentist is waiting for treatment	roofless	2.67	2.29	3.05	0.302 (2)	0.740
	houseless	2.52	2.41	2.62		
	other	2.55	2.36	2.75		
AA3 I don't like lying flat in the dental chair	roofless	1.81	1.46	2.16	0.119 (2)	0.318
	houseless	1.89	1.79	1.99		
	other	1.85	1.67	2.04		

There were no significant differences demonstrable in mean Access Inhibition (AI1–AI6) and Access Anxiety (AA1–AA3) scores between Category of homelessness groups